Changes for the Better

MITSUBISHI ELECTRIC

SPLIT-TYPE, AIR CONDITIONERS

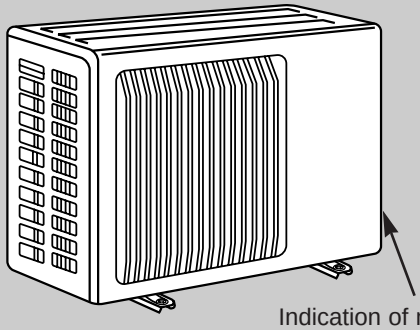
No. OB370

HFC utilized R410A

SERVICE MANUAL

Wireless type Models

MU-GA50VB -E1
MU-GA60VB -E1
MU-GA80VB -E1



Indication of model name
MU-GA50VB -E1

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NOTE:

•This service manual describes technical data of outdoor units.
As for indoor units MS-GA50VB -E1, MS-GA60VB -E1 and MS-GA80VB -E1, refer to the service manual OB369.

CE

1 TECHNICAL CHANGES

MU-A18WV -E1➔MU-GA50VB -E1

1. Oil separator has been removed.
2. Model name has been changed.
   Indication of capacity has been changed. (BTU➔kW)

MU-A24WV -E1➔MU-GA60VB -E1
MU-A30WV -E1➔MU-GA80VB -E1

1. Model name has been changed.
   Indication of capacity has been changed. (BTU➔kW)

INFORMATION FOR THE AIR CONDITIONER WITH R410A REFRIGERANT

- This room air conditioner adopts an HFC refrigerant (R410A) which never destroys the ozone layer.
- Pay particular attention to the following points, though the basic installation procedure is same as that for R22 conditioners.

① As R410A has working pressure approximate 1.6 times as high as that of R22, some special tools and piping parts/ materials are required. Refer to the table below.

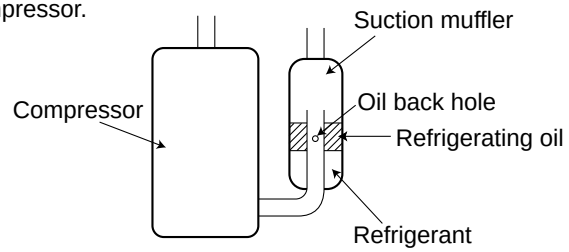
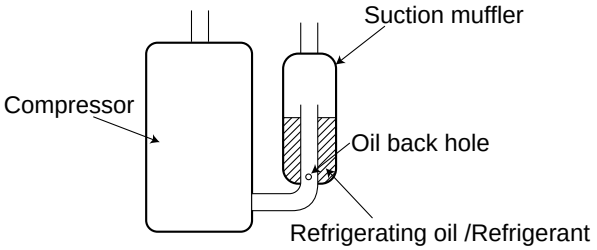
② Take sufficient care not to allow water and other contaminations to enter the R410A refrigerant during storage and installation, since it is more susceptible to contaminations than R22.

③ For refrigerant piping, use clean, pressure-proof parts/materials specifically designed for R410A. (Refer to 2. Refrigerant piping.)

④ Composition change may occur in R410A since it is a mixed refrigerant. When charging, charge liquid refrigerant to prevent composition change.

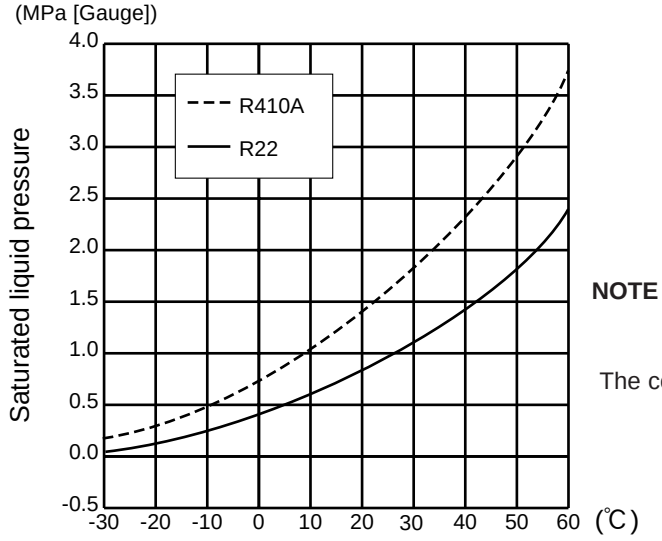
		New refrigerant	Previous refrigerant
Refrigerant	Refrigerant	R410A	R22
	Composition (Ratio)	HFC-32: HFC-125 (50%:50%)	R22 (100%)
	Refrigerant handling	Pseudo-azeotropic refrigerant	Single refrigerant
	Chlorine	Not included	Included
	Safety group (ASHRAE)	A1/A1	A1
	Molecular weight	72.6	86.5
	Boiling point (℃)	-51.4	-40.8
	Steam pressure [25℃](Mpa)	1.557	0.94
	Saturated steam density [25℃](Kg/m³)	64	44.4
	Combustibility	Non combustible	Non combustible
	ODP ※1	0	0.055
	GWP ※2	1730	1700
	Refrigerant charge method	From liquid phase in cylinder	Gas phase
	Additional charge on leakage	Possible	Possible
Refrigerating oil	Kind	Incompatible oil	Compatible oil
	Color	Non	Light yellow
	Smell	Non	Non

※1 :Ozone Depletion Potential : based on CFC-11
※2 :Global Warming Potential : based on CO_2

	New Specification	Current Specification
Compressor	The incompatible refrigerating oil easily separates from refrigerant and is in the upper layer inside the suction muffler. Raising position of the oil back hole enables to back the refrigerating oil of the upper layer to flow back to the compressor. 	Since refrigerant and refrigerating oil are compatible each, refrigerating oil backs to the compressor through the lower position oil back hole. 

NOTE : The unit of pressure has been changed to MPa on the international system of units(SI unit system).
The conversion factor is: **1(MPa [Gauge]) =10.2(kgf/㎠ [Gauge])**

Conversion chart of refrigerant temperature and pressure



NOTE : The unit of pressure has been changed to MPa on the international system of units(SI unit system).

The conversion factor is: **1(MPa [Gauge]) =10.2(kgf/㎠ [Gauge])**

1.Tools dedicated for the air conditioner with R410A refrigerant

The following tools are required for R410A refrigerant. Some R22 tools can be substituted for R410A tools.
The diameter of the service port on the stop valve in outdoor unit has been changed to prevent any other refrigerant being charged into the unit. Cap size has been changed from 7/16 UNF with 20 threads to 1/2 UNF with 20 threads.

R410A tools	Can R22 tools be used?	Description
Gauge manifold	No	R410A has high pressures beyond the measurement range of existing gauges. Port diameters have been changed to prevent any other refrigerant from being charged into the unit.
Charge hose	No	Hose material and cap size have been changed to improve the pressure resistance.
Gas leak detector	No	Dedicated for HFC refrigerant.
Torque wrench	Yes	6.35 mm and 9.52 mm
	No	12.7 mm and 15.88 mm
Flare tool	Yes	Clamp bar hole has been enlarged to reinforce the spring strength in the tool.
Flare gauge	New	Provided for flaring work (to be used with R22 flare tool).
Vacuum pump adapter	New	Provided to prevent the back flow of oil. This adapter enables you to use vacuum pumps.
Electronic scale for refrigerant charging	New	It is difficult to measure R410A with a charging cylinder because the refrigerant bubbles due to high pressure and high-speed vaporization

No : Not Substitutable for R410A Yes : Substitutable for R410A

2.Refrigerant piping

① Specifications

Use the refrigerant pipes that meet the following specifications.

Pipe	Outside diameter mm	Wall thickness	Insulation material
For liquid	6.35	0.8 mm	Heat resisting foam plastic Specific gravity 0.045 Thickness 8 mm
	9.52	0.8 mm	
For gas	12.7	0.8 mm	
	15.88	1.0 mm	

- Use a copper pipe or a copper-alloy seamless pipe with a thickness of 0.8 mm (6.35, 9.52, 12.7), 1.0 mm (15.88). Never use any pipe with a thickness less than 0.8 mm (6.35, 9.52, 12.7), 1.0 mm (15.88), as the pressure resistance is insufficient.

② Flaring work and flare nut

Flaring work for R410A pipe differs from that for R22 pipe.

For details of flaring work, refer to Installation manual “FLARING WORK”.

Pipe diameter	Dimension of flare nut	
mm	R410A	R22
6.35	17	17
9.52	22	22
12.7	26	24
15.88	29	27

3.Refrigerant oil

Apply the special refrigeration oil (accessories: packed with indoor unit) to the flare and the union seat surfaces.

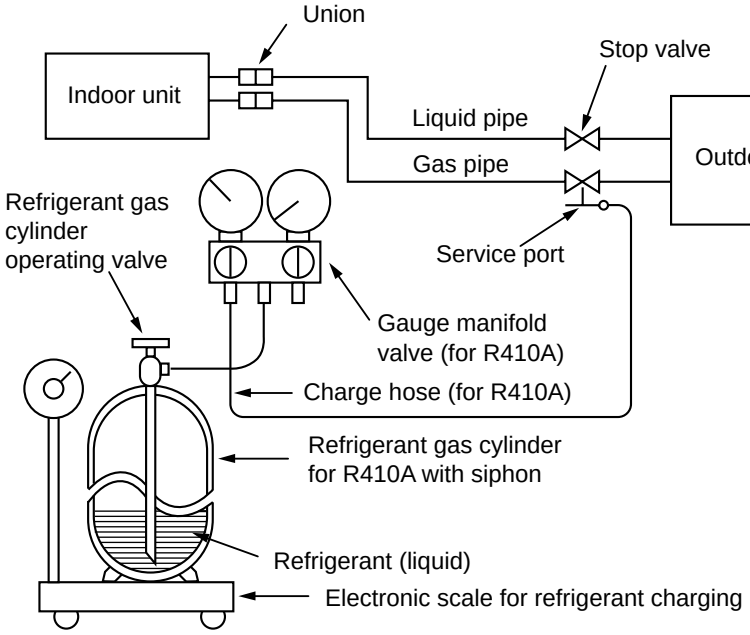
4.Air purge

- Do not discharge the refrigerant into the atmosphere.
  Take care not to discharge refrigerant into the atmosphere during installation, reinstallation, or repairs to the refrigerant circuit.
- Use the vacuum pump for air purging for the purpose of environmental protection.

5.Additional charge

For additional charging, charge the refrigerant from liquid phase of the gas cylinder.

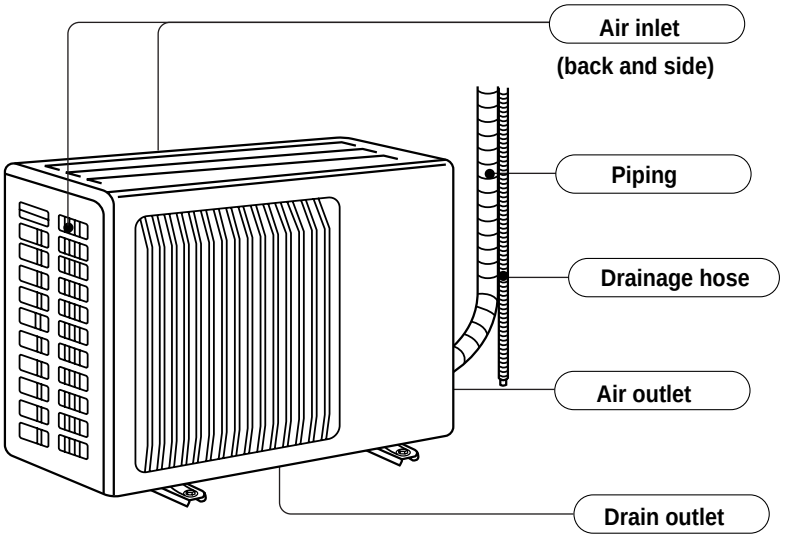
If the refrigerant is charged from the gas phase, composition change may occur in the refrigerant inside the cylinder and the outdoor unit. In this case, ability of the refrigerating cycle decreases or normal operation can be impossible. However, charging the liquid refrigerant all at once may cause the compressor to be locked. Thus, charge the refrigerant slowly.



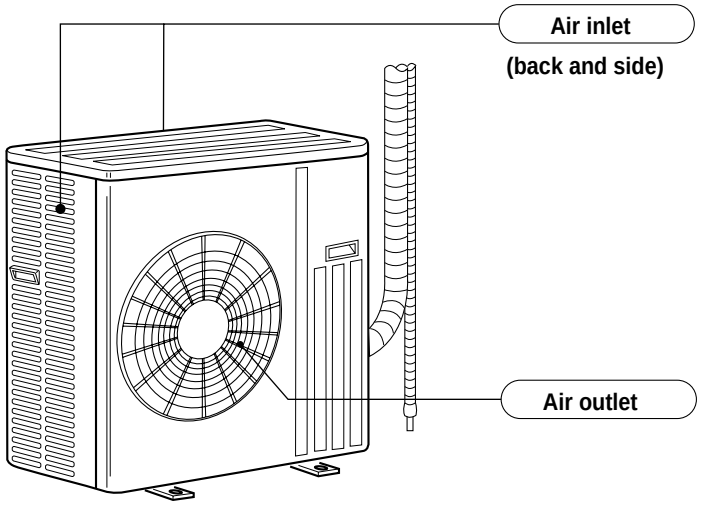
2 PART NAMES AND FUNCTIONS

OUTDOOR UNIT

MU-GA50VB -E1
MU-GA60VB -E1



MU-GA80VB -E1



3 SPECIFICATION

Outdoor model			MU-GA50VB - E1	MU-GA60VB - E1
Function			Cooling	Cooling
Power supply			Single phase 230V, 50Hz	Single phase 230V, 50Hz
Capacity	Capacity	kW	5.0	6.5
	Dehumidification	ℓ /h	2.5	3.4
	Air flow(High)	m³ /h	2,196	2,322
Electrical data	Power outlet	A	15	25
	Running current	A	7.90	10.82
	Power input	W	1,750	2,420
	Power factor	%	96	97
	Starting current	A	37	74
	Compressor motor current	A	7.51	10.27
	Fan motor current	A	0.39	0.55
Coefficient of performance(C.O.P)			2.76	2.62
Compressor	Model		RN196VHSHT	NN29VBAHT
	Output	W	1,300	1,900
	Winding resistance(at 20℃)	Ω	C-R 1.80 C-S 3.00	C-R 0.80 C-S 1.64
Fan motor	Model		RA6V50-PA	RA6V60-MA
	Winding resistance(at 20℃)	Ω	WHT-BLK 79.5 BLK-RED 83.0	WHT-BLK 71 BLK-RED 89
	Dimensions W×H×D	mm	850×605×290	850×605×290
	Weight	kg	44	60
Special remarks	Sound level(High)	dB	52	53
	Fan speed(High)	rpm	828	873
	Fan speed regulator		1	1
	Refrigerant filling capacity(R410A)	kg	1.45	2.00
	Refrigerating oil (Model)	cc	520 (NEO22)	1,200 (NEO22)

NOTE: Test conditions are based on ISO 5151.
Cooling : Indoor DB27°C WB19°C
Outdoor DB35°C WB(24°C)
Indoor-Outdoor piping length : 5m

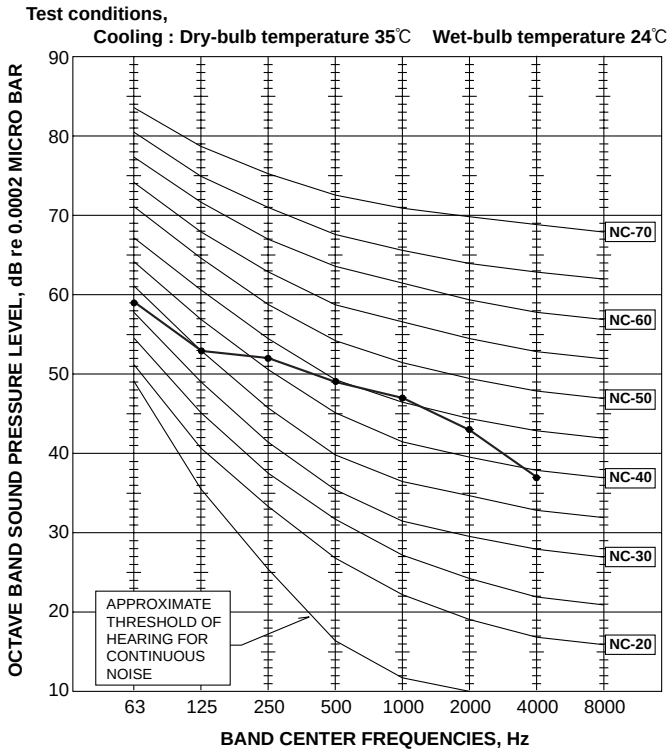
Outdoor model			**MU-GA80VB -** E1
Function			Cooling
Power supply			Single phase 230V, 50Hz
Capacity	Capacity	kW	8.5
	Dehumidification	ℓ /h	4.6
	Air flow(High/Low※)	m³ /h	2,940/1,470※
Electrical data	Power outlet	A	25
	Running current	A	14.42
	Power input	W	3,191
	Power factor	%	96
	Starting current	A	90
	Compressor motor current	A	13.85
	Fan motor current	A	0.57
Coefficient of performance(C.O.P)			2.61
Compressor	Model		NN37VAAHT
	Output	W	2,500
	Winding resistance(at 20℃)	Ω	C-R 0.64 C-S 1.63
Fan motor	Model		RA6V75-AD
	Winding resistance(at 20℃)	Ω	WHT-BLK 62.8 BLK-YLW 55.9 YLW-RED 26.0
	Dimensions W×H×D	mm	840×850×330
	Weight	kg	75
Special remarks	Sound level(High/Low※)	dB	55/53※
	Fan speed(High/Low※)	rpm	805/435※
	Fan speed regulator		2
	Refrigerant filling capacity(R410A)	kg	2.40
	Refrigerating oil (Model)	cc	1,300 (NEO 22)
	Thermistor RT62(at 25℃)	kΩ	231.44
	Thermistor RT63(at 0℃)	kΩ	33.18

NOTE: Test conditions are based on ISO 5151.
Cooling : Indoor DB27°C WB19°C
Outdoor DB35°C WB(24°C)
Indoor-Outdoor piping length : 5m
※ Reference value

4 NOISE CRITERIA CURVES

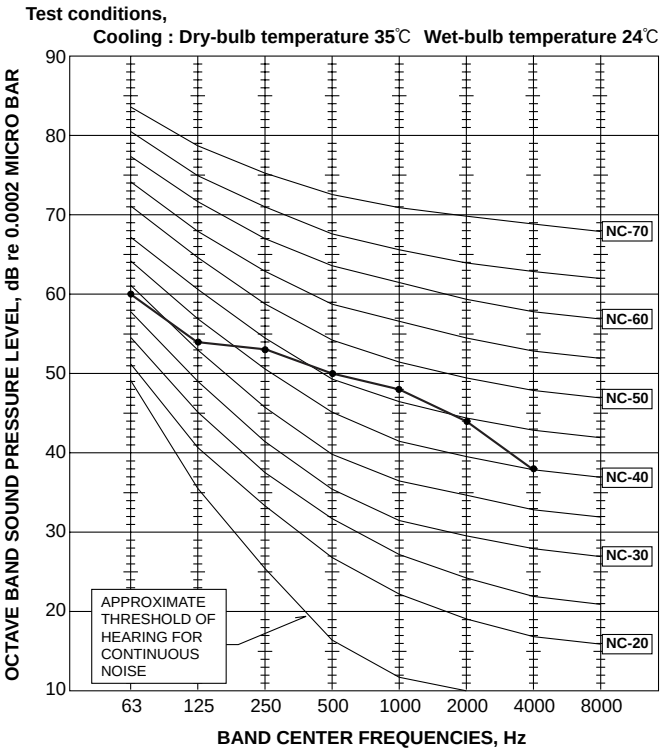
MU-GA50VB -E1

FAN SPEED	SPL(dB(A))	LINE
High	52	●——●



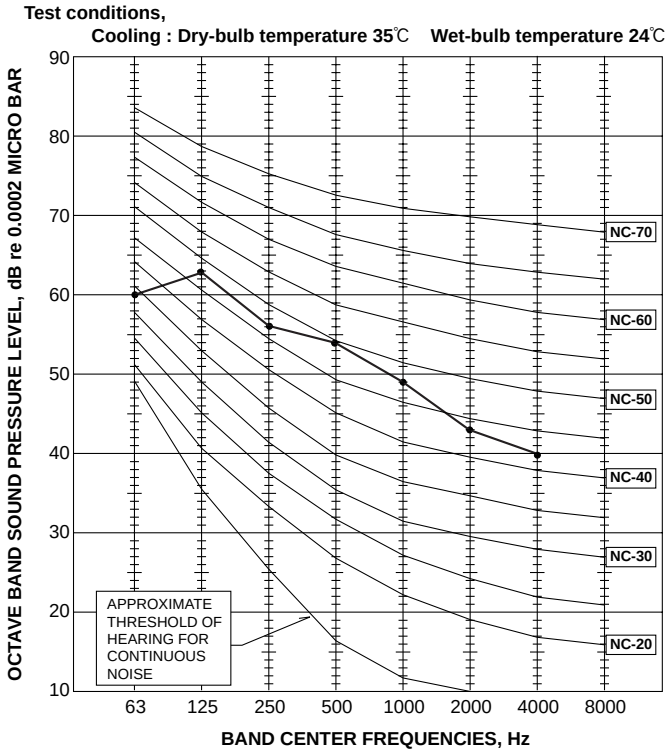
MU-GA60VB -E1

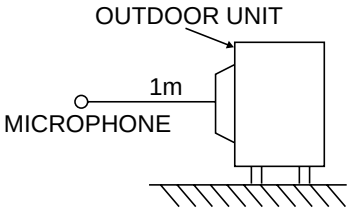
FAN SPEED	SPL(dB(A))	LINE
High	53	●——●



MU-GA80VB -E1

FAN SPEED	SPL(dB(A))	LINE
High	55	●——●



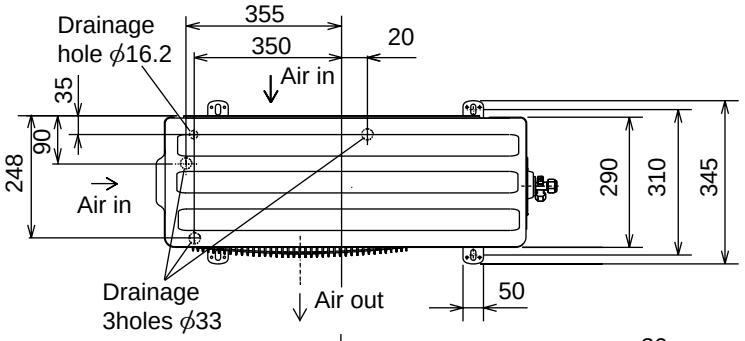


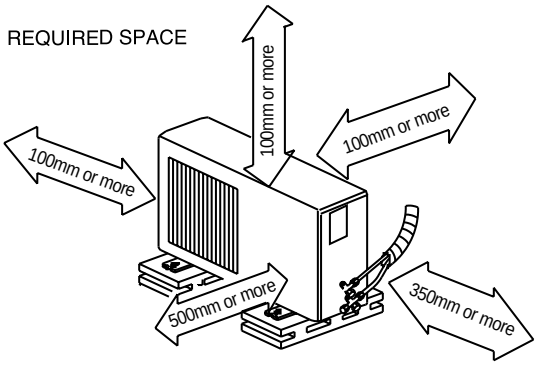
5 OUTLINES AND DIMENSIONS

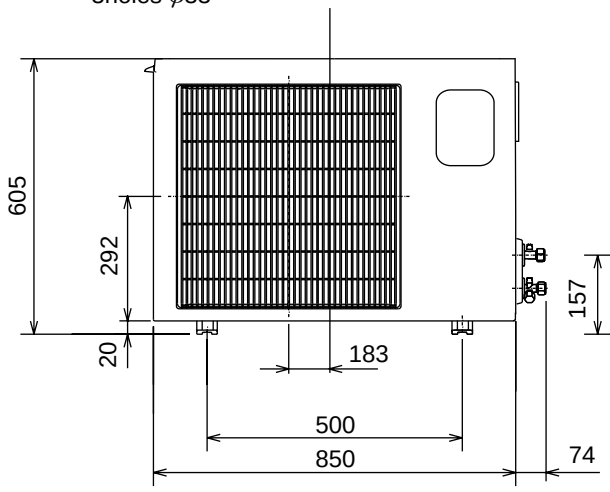
MU-GA50VB -E1 MU-GA60VB -E1

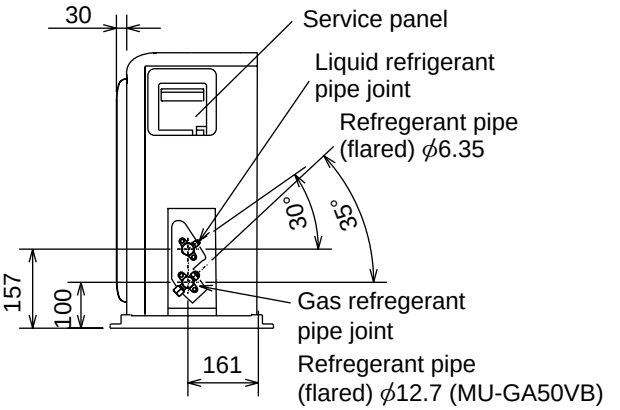
Unit: mm

OUTDOOR UNIT



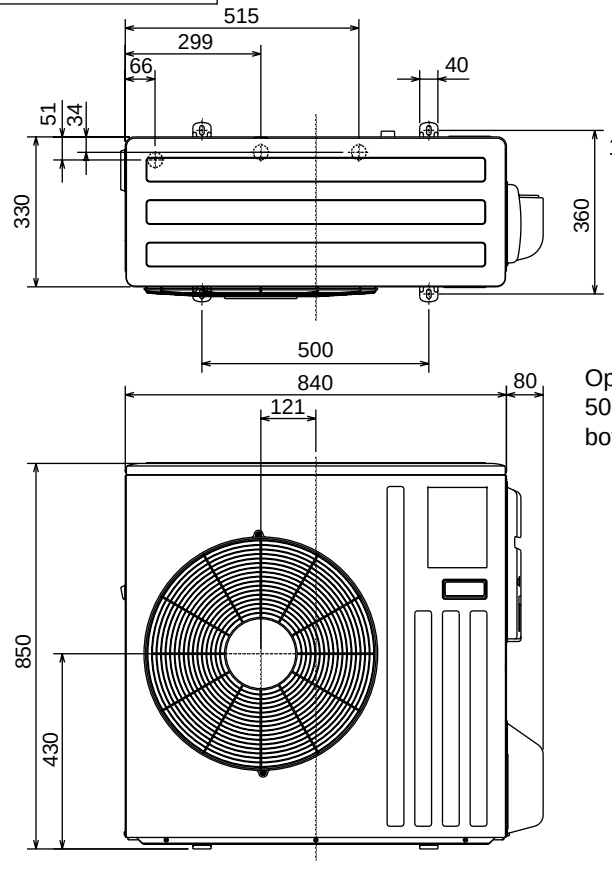


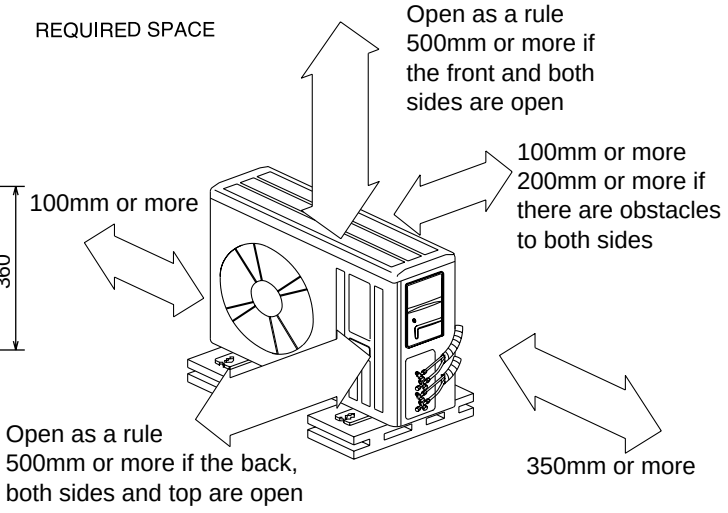


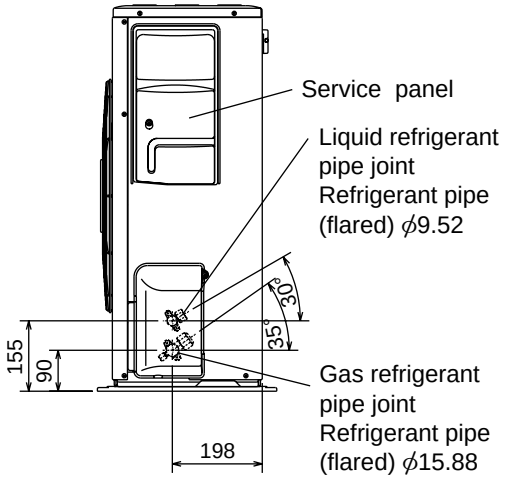


MU-GA80VB -E1

OUTDOOR UNIT




REQUIRED SPACE
Open as a rule 500mm or more if the front and both sides are open
100mm or more
100mm or more 200mm or more if there are obstacles to both sides
Open as a rule 500mm or more if the back, both sides and top are open
350mm or more

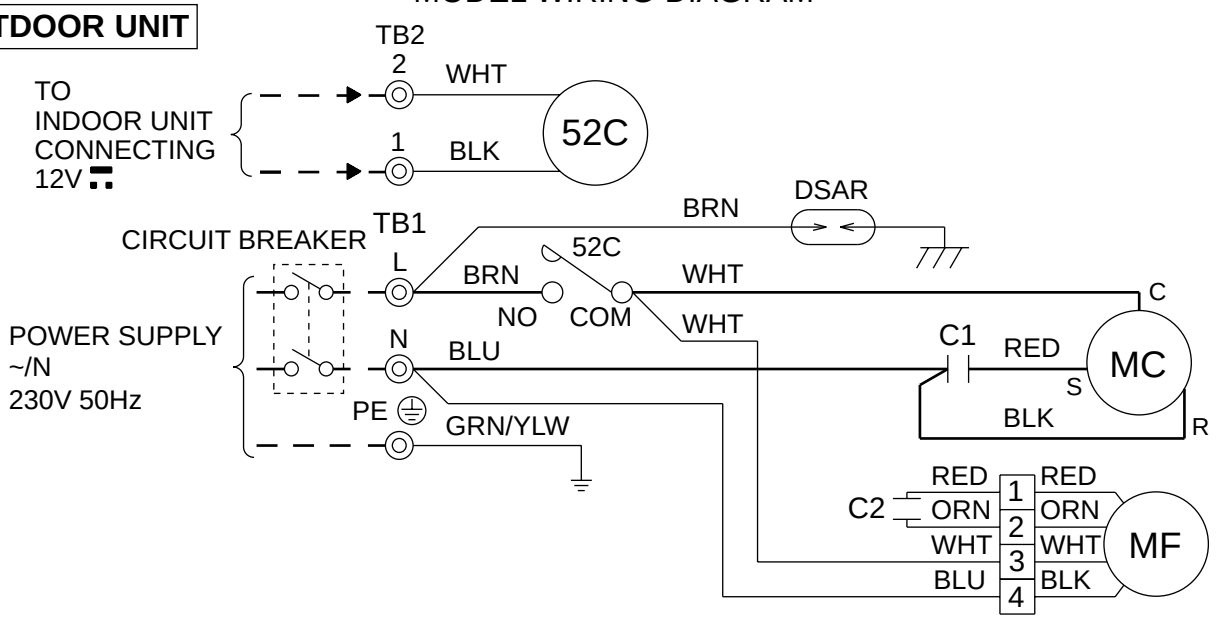


6 WIRING DIAGRAM

MU-GA50VB -E1

OUTDOOR UNIT

MODEL WIRING DIAGRAM



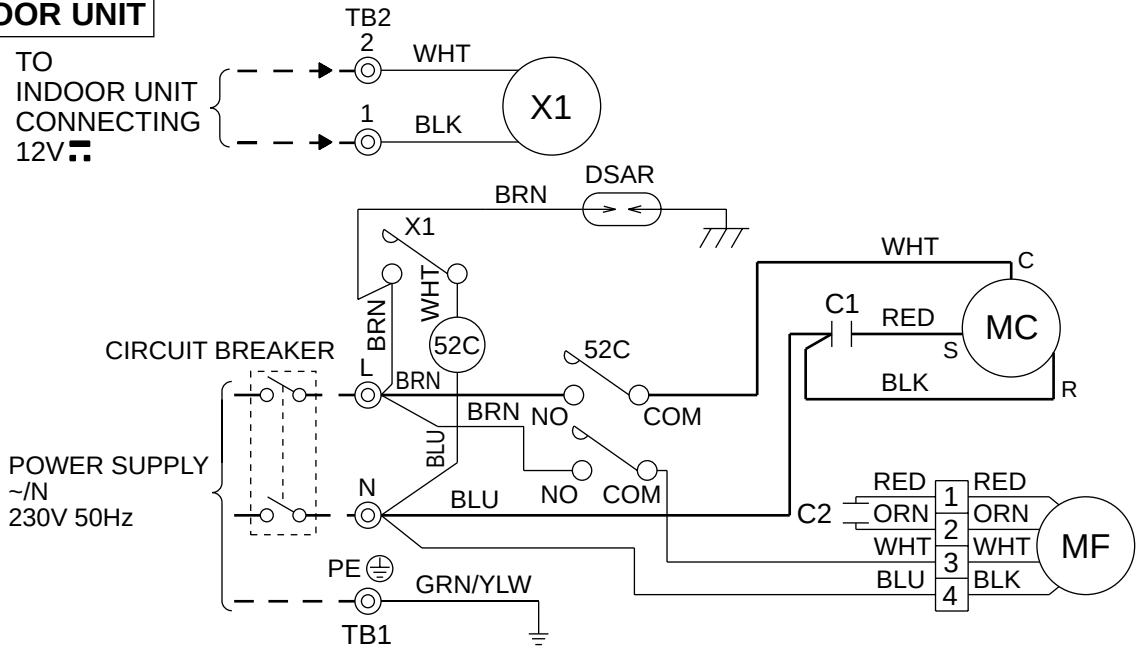
SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C1	COMPRESSOR CAPACITOR	MC	COMPRESSOR (INNER PROTECTOR)	52C	COMPRESSOR CONTACTOR
C2	OUTDOOR FAN CAPACITOR	MF	OUTDOOR FAN MOTOR (INNER PROTECTOR)		
DSAR	SURGE ABSORBER	TB1,TB2	TERMINAL BLOCK		

NOTES: 1.About the indoor side electric wiring refer to the indoor unit electric wiring diagram for servicing.
2.Use copper conductors only. (For field wiring)
3.Symbols below indicate.
◎ : Terminal block ▭▭ : Connector

MU-GA60VB -E1

OUTDOOR UNIT

MODEL WIRING DIAGRAM



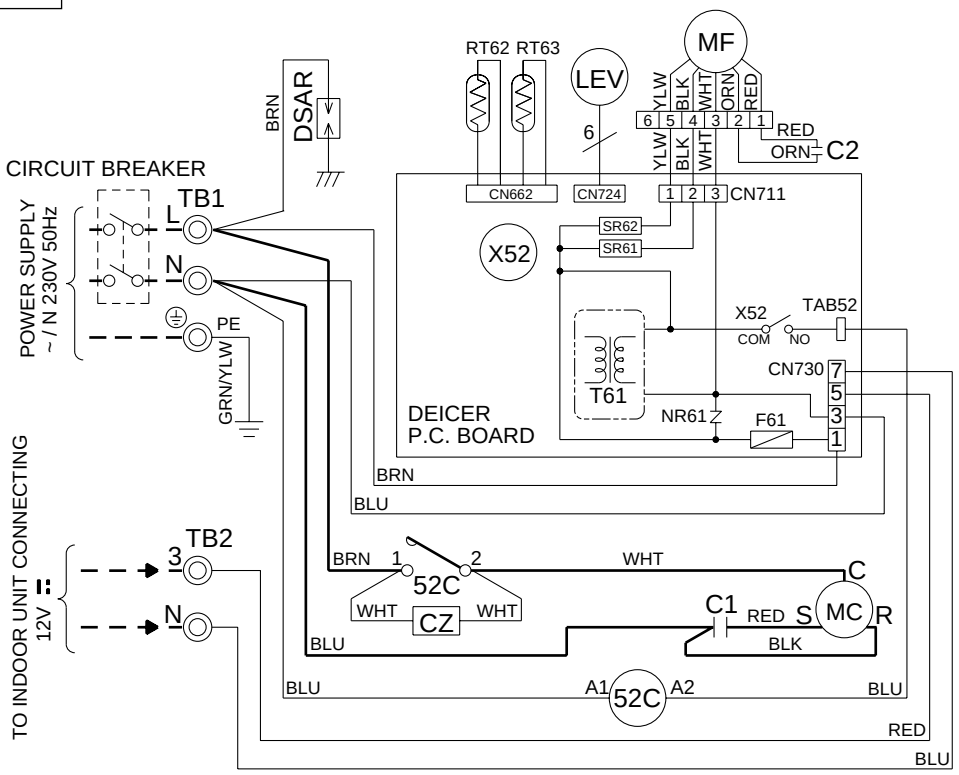
SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C1	COMPRESSOR CAPACITOR	MC	COMPRESSOR (INNER PROTECTOR)	X1	RELAY
C2	OUTDOOR FAN CAPACITOR	MF	OUTDOOR FAN MOTOR (INNER PROTECTOR)	52C	COMPRESSOR CONTACTOR
DSAR	SURGE ABSORBER	TB1,TB2	TERMINAL BLOCK		

NOTES: 1.About the indoor side electric wiring refer to the indoor unit electric wiring diagram for servicing.
2.Use copper conductors only. (For field wiring)
3.Symbols below indicate.
◎ : Terminal block ▭▭ : Connector

MU-GA80VB - E1

OUTDOOR UNIT

MODEL WIRING DIAGRAM



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
CZ	CZ SURGE ABSORBER	MC	COMPRESSOR (INNER PROTECTOR)	SR62	SOLID STATE RELAY
C1	COMPRESSOR CAPACITOR	MF	OUTDOOR FAN MOTOR (INNER PROTECTOR)	TB1	TERMINAL BLOCK
C2	OUTDOOR FAN CAPACITOR	NR61	VARISTOR	TB2	TERMINAL BLOCK
DSAR	SURGE ABSORBER	RT62	DISCHARGE TEMPERATURE THERMISTOR	T61	TRANSFORMER
F61	FUSE(3.15A)	RT63	AMBIENT TEMPERATURE THERMISTOR	X52	CONTACTOR
LEV	EXPANSION VALVE COIL	SR61	SOLID STATE RELAY	52C	COMPRESSOR CONTACTOR

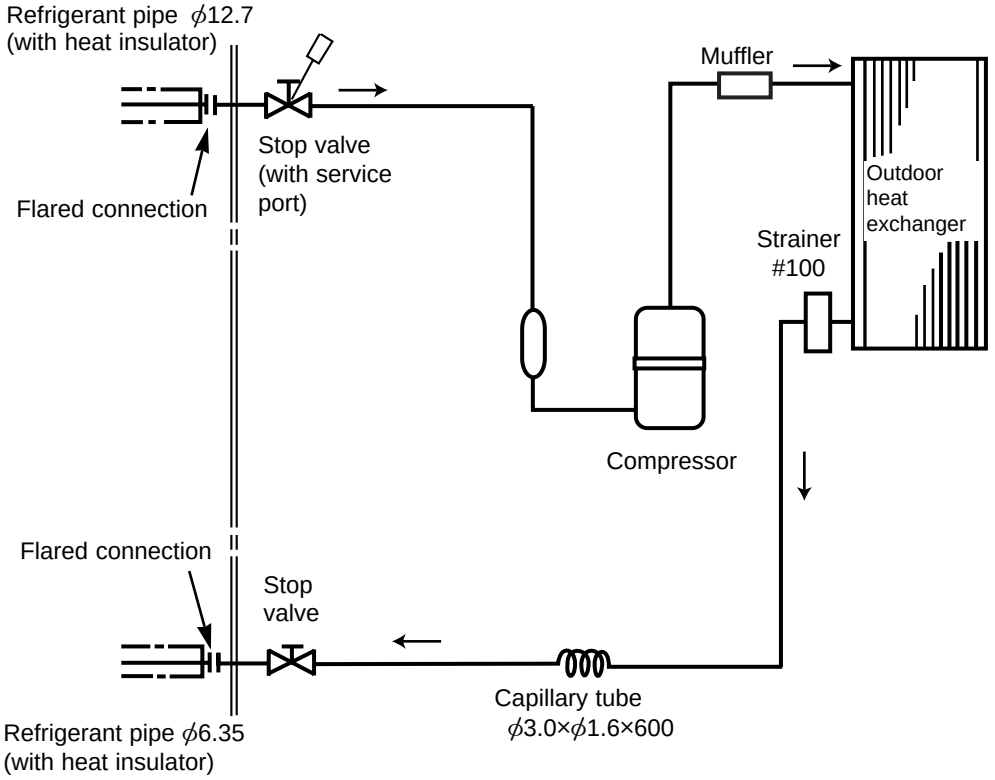
NOTE 1. Use copper conductors only (For field wiring).
2. Since the indoor and outdoor unit connecting wires have polarity, connect them according to the numbers (3,N).
3. Symbols below indicate.
◎: Terminal block, □□□□: Connector

7 REFRIGERANT SYSTEM DIAGRAM

MU-GA50VB -E1

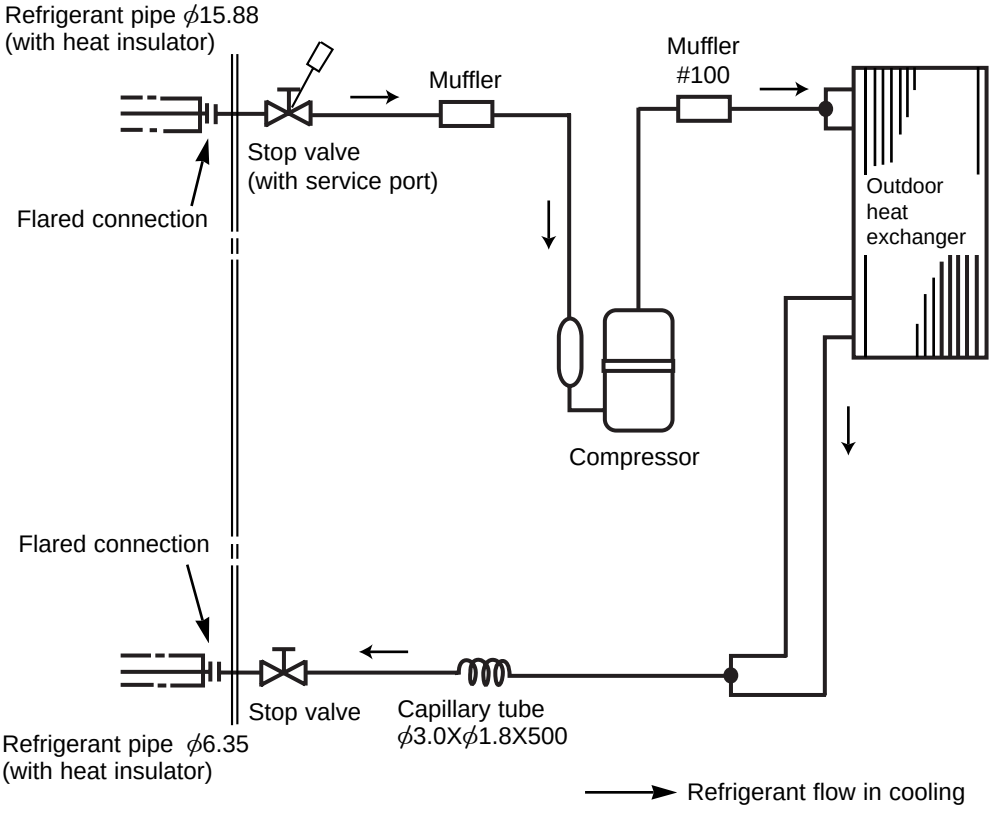
Unit:mm

OUTDOOR UNIT



MU-GA60VB -E1

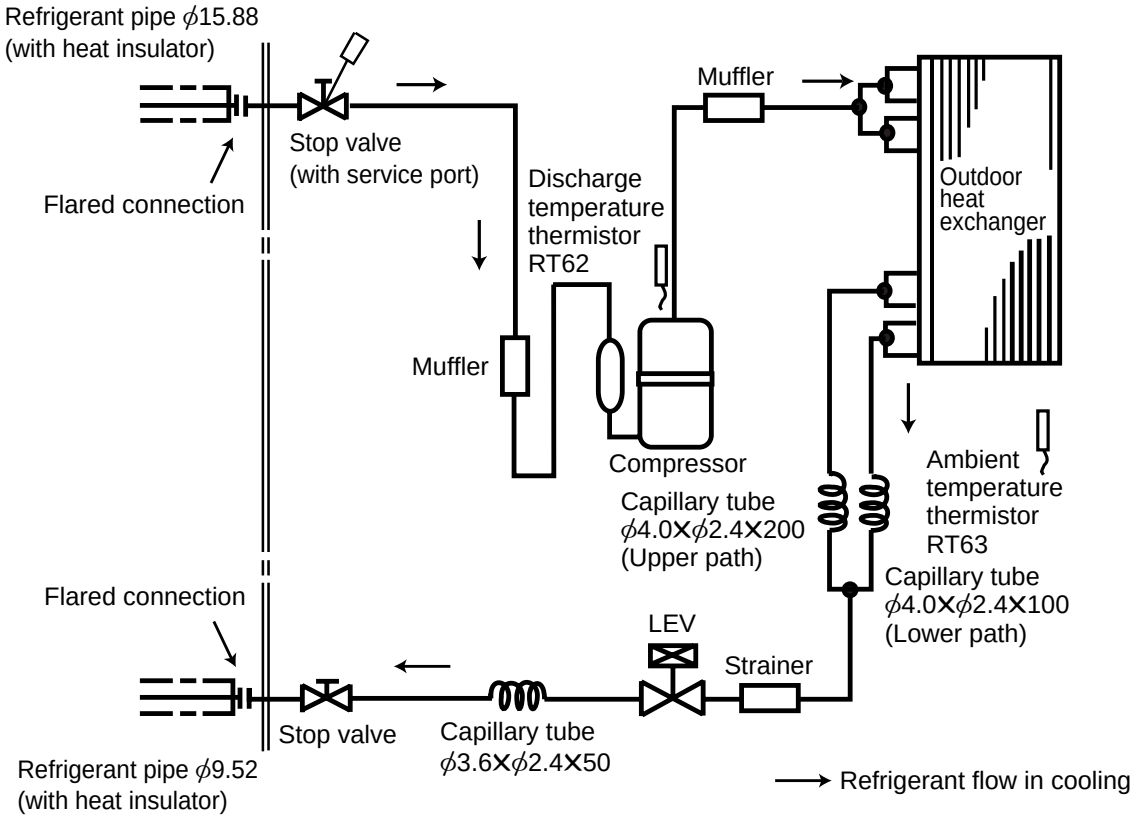
OUTDOOR UNIT



MU-GA80VB - E1

Unit:mm

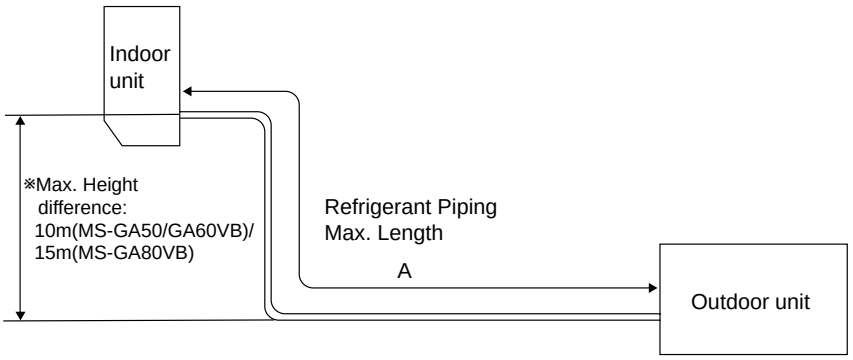
OUTDOOR UNIT



MAX. REFRIGERANT PIPING LENGTH

Model	Refrigerant piping Max. length : m A	Piping size O.D : mm		Length of connecting pipe : m	
		Gas	Liquid	Indoor unit	Outdoor unit
MU-GA50VB - E1	25	12.7	6.35	Gas 0.43 Liquid 0.5	Gas 0 Liquid 0
MU-GA60VB - E1		15.88			
MU-GA80VB - E1	30		9.52		

MAX. HEIGHT DIFFERENCE



※ Height difference should be within 10m(MS-GA50/GA60VB)/
15m(MS-GA80VB) regardless of which unit, indoor or outdoor position is high.

ADDITIONAL REFRIGERANT CHARGE(R410A : g)

Model	Outdoor unit precharged	Refrigerant piping length (one way)				
		7m	10m	15m	20m	25m
MU-GA50VB - E1	1,450	0	60	160	260	360

Calculation : Xg=20g/m × (Refrigerant piping length (m)–7)

Model	Outdoor unit precharged	Refrigerant piping length (one way)				
		7m	10m	15m	20m	25m
MU-GA60VB - E1	2,000	0	60	160	260	360

Calculation : Xg=20g/m × (Refrigerant piping length (m)–7)

Model	Outdoor unit precharged	Refrigerant piping length (one way)					
		7m	10m	15m	20m	25m	30m
MU-GA80VB - E1	2,400	0	165	440	715	990	1,165

Calculation : Xg=55g/m×(Refrigerant piping length(m)-7)

8 PERFORMANCE CURVES

MU-GA50VB -E1 MU-GA60VB -E1 MU-GA80VB -E1

The standard data contained in these specifications apply only to the operation of the air conditioner under normal conditions, since operating conditions vary according to the areas where these units are installed. The following information has been provided to clarify the operating characteristics of the air conditioner under the conditions indicated by the performance curve.

(1) GUARANTEED VOLTAGE

198 ~ 264V, 50Hz

(2) AIR FLOW

Air flow should be set at MAX.

(3) MAIN READINGS

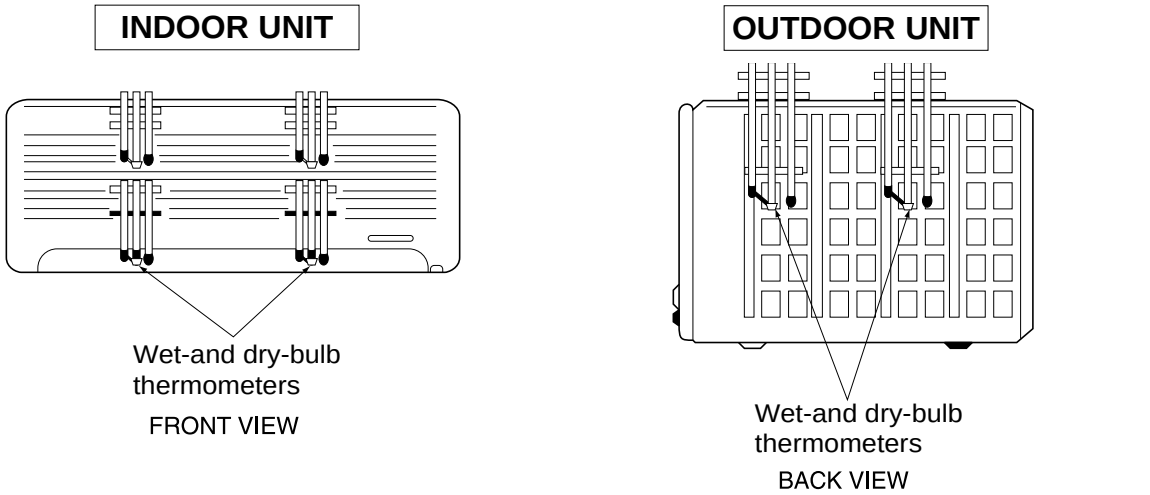
(1) Indoor intake air wet-bulb temperature : °CWB
(2) Indoor outlet air wet-bulb temperature : °CWB
(3) Outdoor intake air dry-bulb temperature : °CDB
(4) Total input: W

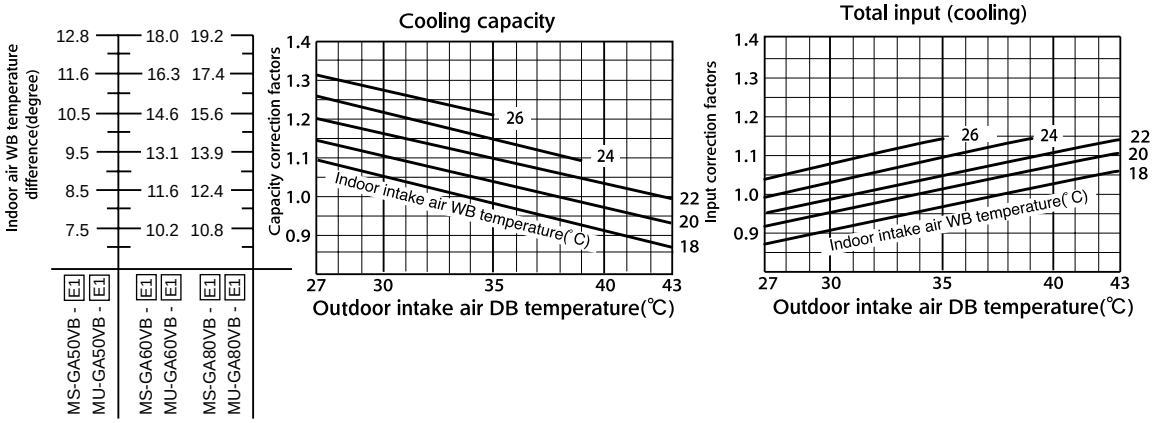
} Cooling

Indoor air wet/dry-bulb temperature difference on the left side of the chart on this page shows the difference between the indoor intake air wet/dry-bulb temperature and the indoor outlet air wet/dry-bulb temperature for your reference at service.

How to measure the indoor air wet-bulb/dry-bulb temperature difference

1. Attach at least 2 sets of wet-and dry-bulb thermometers to the indoor air intake as shown in the figure, and at least 2 sets of wet-and dry-bulb thermometers to the indoor air outlet. The thermometers must be attached to the position where air speed is high.
2. Attach at least 2 sets of wet-and dry-bulb thermometers to the outdoor air intake. Cover the thermometers to prevent direct rays of the sun.
3. Check that the air filter is cleaned.
4. Open windows and doors of room.
5. Press the EMERGENCY OPERATION switch once to start the EMERGENCY COOL MODE.
6. When system stabilizes after more than 15 minutes, measure temperature and take an average temperature.
7. 10 minutes later, measure temperature again and check that the temperature does not change.




Indoor air WB temperature difference(degree)
12.8 18.0 19.2
11.6 16.3 17.4
10.5 14.6 15.6
9.5 13.1 13.9
8.5 11.6 12.4
7.5 10.2 10.8
E1 E1 MS-GA50VB - MU-GA50VB -
E1 E1 MS-GA60VB - MU-GA60VB -
E1 E1 MS-GA80VB - MU-GA80VB -
Cooling capacity
Capacity correction factors
1.4 1.3 1.2 1.1 1.0 0.9
26 24 22 20 18
Indoor intake air WB temperature(°C)
27 30 35 40 43
Outdoor intake air DB temperature(°C)
Total input (cooling)
Input correction factors
1.4 1.3 1.2 1.1 1.0 0.9
26 24 22 20 18
Indoor intake air WB temperature(°C)
27 30 35 40 43
Outdoor intake air DB temperature(°C)

OUTDOOR LOW PRESSURE AND OUTDOOR UNIT CURRENT

COOL operation

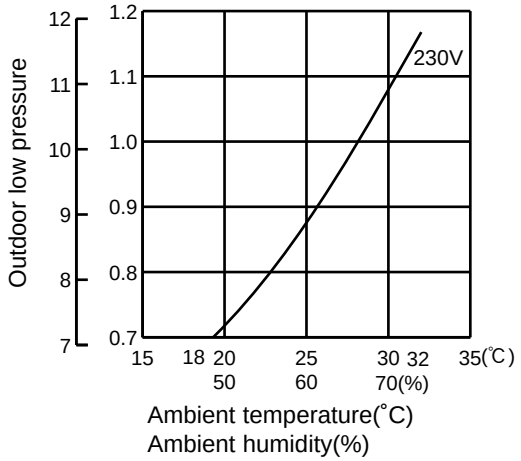
① Both indoor and outdoor unit are under the same temperature/humidity condition.

Dry-bulb temperature	Relative humidity(%)
20	50
25	60
30	70

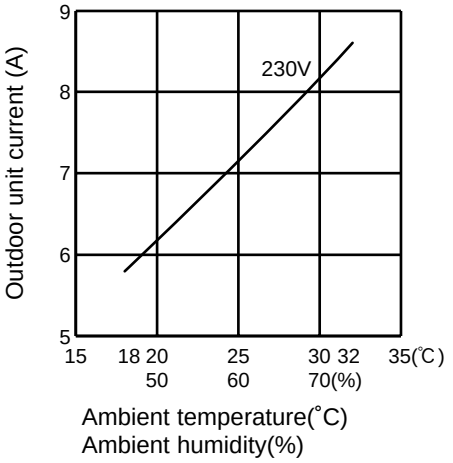
② Air flow should be set at MAX.

③ The unit of pressure has been changed to MPa on the international system of units(SI unit system).
The conversion factor is : **1(MPa [Gauge]) =10.2(kgf/㎠ [Gauge])**

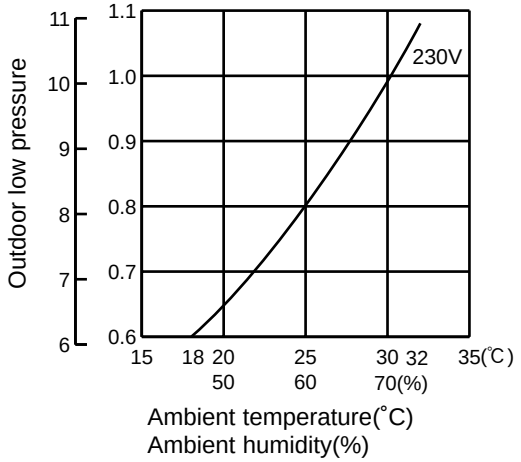
(kgf/㎠[Gauge])(MPa[Gauge]) **MU-GA50VB -E1**



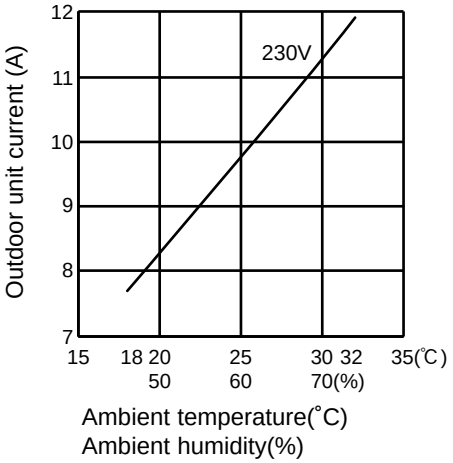
MU-GA50VB -E1



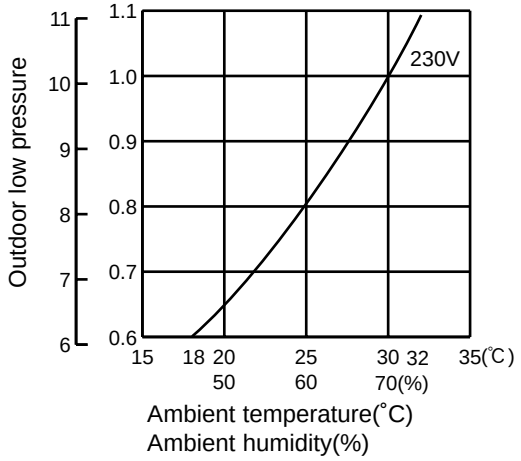
(kgf/㎠[Gauge])(MPa[Gauge]) **MU-GA60VB -E1**



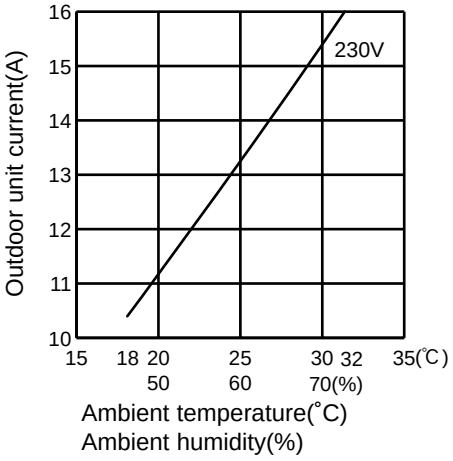
MU-GA60VB -E1



(kgf/㎠[Gauge])(MPa[Gauge]) **MU-GA80VB -E1**



MU-GA80VB -E1



PERFORMANCE DATA COOL operation

MS-GA50VB -E1 : MU-GA50VB -E1 (230V)

CAPACITY : 5.0(kW) SHF : 0.65 INPUT : 1810(W)

		OUTDOOR DB(℃)															
INDOOR	INDOOR	21				25				27				30			
DB(℃)	WB(℃)	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT
21	18	5.88	2.76	0.47	1448	5.63	2.64	0.47	1520	5.40	2.54	0.47	1593	5.20	2.44	0.47	1665
21	20	6.13	2.14	0.35	1520	5.88	2.06	0.35	1611	5.70	2.00	0.35	1647	5.50	1.93	0.35	1720
22	18	5.88	3.00	0.51	1448	5.63	2.87	0.51	1520	5.40	2.75	0.51	1593	5.20	2.65	0.51	1665
22	20	6.13	2.39	0.39	1520	5.88	2.29	0.39	1611	5.70	2.22	0.39	1647	5.50	2.15	0.39	1720
22	22	6.38	1.72	0.27	1575	6.15	1.66	0.27	1674	6.00	1.62	0.27	1720	5.75	1.55	0.27	1792
23	18	5.88	3.23	0.55	1448	5.63	3.09	0.55	1520	5.40	2.97	0.55	1593	5.20	2.86	0.55	1665
23	20	6.13	2.63	0.43	1520	5.88	2.53	0.43	1611	5.70	2.45	0.43	1647	5.50	2.37	0.43	1720
23	22	6.38	1.98	0.31	1575	6.15	1.91	0.31	1674	6.00	1.86	0.31	1720	5.75	1.78	0.31	1792
24	18	5.88	3.47	0.59	1448	5.63	3.32	0.59	1520	5.40	3.19	0.59	1593	5.20	3.07	0.59	1665
24	20	6.13	2.88	0.47	1520	5.88	2.76	0.47	1611	5.70	2.68	0.47	1647	5.50	2.59	0.47	1720
24	22	6.38	2.23	0.35	1575	6.15	2.15	0.35	1674	6.00	2.10	0.35	1720	5.75	2.01	0.35	1792
24	24	6.70	1.54	0.23	1647	6.45	1.48	0.23	1738	6.30	1.45	0.23	1792	6.10	1.40	0.23	1882
25	18	5.88	3.70	0.63	1448	5.63	3.54	0.63	1520	5.40	3.40	0.63	1593	5.20	3.28	0.63	1665
25	20	6.13	3.12	0.51	1520	5.88	3.00	0.51	1611	5.70	2.91	0.51	1647	5.50	2.81	0.51	1720
25	22	6.38	2.49	0.39	1575	6.15	2.40	0.39	1674	6.00	2.34	0.39	1720	5.75	2.24	0.39	1792
25	24	6.70	1.81	0.27	1647	6.45	1.74	0.27	1738	6.30	1.70	0.27	1792	6.10	1.65	0.27	1882
26	18	5.88	3.94	0.67	1448	5.63	3.77	0.67	1520	5.40	3.62	0.67	1593	5.20	3.48	0.67	1665
26	20	6.13	3.37	0.55	1520	5.88	3.23	0.55	1611	5.70	3.14	0.55	1647	5.50	3.03	0.55	1720
26	22	6.38	2.74	0.43	1575	6.15	2.64	0.43	1674	6.00	2.58	0.43	1720	5.75	2.47	0.43	1792
26	24	6.70	2.08	0.31	1647	6.45	2.00	0.31	1738	6.30	1.95	0.31	1792	6.10	1.89	0.31	1882
26	26	6.90	1.31	0.19	1738	6.70	1.27	0.19	1828	6.60	1.25	0.19	1882	6.40	1.22	0.19	1937
27	18	5.88	4.17	0.71	1448	5.63	3.99	0.71	1520	5.40	3.83	0.71	1593	5.20	3.69	0.71	1665
27	20	6.13	3.61	0.59	1520	5.88	3.47	0.59	1611	5.70	3.36	0.59	1647	5.50	3.25	0.59	1720
27	22	6.38	3.00	0.47	1575	6.15	2.89	0.47	1674	6.00	2.82	0.47	1720	5.75	2.70	0.47	1792
27	24	6.70	2.35	0.35	1647	6.45	2.26	0.35	1738	6.30	2.21	0.35	1792	6.10	2.14	0.35	1882
27	26	6.90	1.59	0.23	1738	6.70	1.54	0.23	1828	6.60	1.52	0.23	1882	6.40	1.47	0.23	1937
28	18	5.88	4.41	0.75	1448	5.63	4.22	0.75	1520	5.40	4.05	0.75	1593	5.20	3.90	0.75	1665
28	20	6.13	3.86	0.63	1520	5.88	3.70	0.63	1611	5.70	3.59	0.63	1647	5.50	3.47	0.63	1720
28	22	6.38	3.25	0.51	1575	6.15	3.14	0.51	1674	6.00	3.06	0.51	1720	5.75	2.93	0.51	1792
28	24	6.70	2.61	0.39	1647	6.45	2.52	0.39	1738	6.30	2.46	0.39	1792	6.10	2.38	0.39	1882
28	26	6.90	1.86	0.27	1738	6.70	1.81	0.27	1828	6.60	1.78	0.27	1882	6.40	1.73	0.27	1937
29	18	5.88	4.64	0.79	1448	5.63	4.44	0.79	1520	5.40	4.27	0.79	1593	5.20	4.11	0.79	1665
29	20	6.13	4.10	0.67	1520	5.88	3.94	0.67	1611	5.70	3.82	0.67	1647	5.50	3.69	0.67	1720
29	22	6.38	3.51	0.55	1575	6.15	3.38	0.55	1674	6.00	3.30	0.55	1720	5.75	3.16	0.55	1792
29	24	6.70	2.88	0.43	1647	6.45	2.77	0.43	1738	6.30	2.71	0.43	1792	6.10	2.62	0.43	1882
29	26	6.90	2.14	0.31	1738	6.70	2.08	0.31	1828	6.60	2.05	0.31	1882	6.40	1.98	0.31	1937
30	18	5.88	4.88	0.83	1448	5.63	4.67	0.83	1520	5.40	4.48	0.83	1593	5.20	4.32	0.83	1665
30	20	6.13	4.35	0.71	1520	5.88	4.17	0.71	1611	5.70	4.05	0.71	1647	5.50	3.91	0.71	1720
30	22	6.38	3.76	0.59	1575	6.15	3.63	0.59	1674	6.00	3.54	0.59	1720	5.75	3.39	0.59	1792
30	24	6.70	3.15	0.47	1647	6.45	3.03	0.47	1738	6.30	2.96	0.47	1792	6.10	2.87	0.47	1882
30	26	6.90	2.42	0.35	1738	6.70	2.35	0.35	1828	6.60	2.31	0.35	1882	6.40	2.24	0.35	1937
31	18	5.88	5.11	0.87	1448	5.63	4.89	0.87	1520	5.40	4.70	0.87	1593	5.20	4.52	0.87	1665
31	20	6.13	4.59	0.75	1520	5.88	4.41	0.75	1611	5.70	4.28	0.75	1647	5.50	4.13	0.75	1720
31	22	6.38	4.02	0.63	1575	6.15	3.87	0.63	1674	6.00	3.78	0.63	1720	5.75	3.62	0.63	1792
31	24	6.70	3.42	0.51	1647	6.45	3.29	0.51	1738	6.30	3.21	0.51	1792	6.10	3.11	0.51	1882
31	26	6.90	2.69	0.39	1738	6.70	2.61	0.39	1828	6.60	2.57	0.39	1882	6.40	2.50	0.39	1937
32	18	5.88	5.35	0.91	1448	5.63	5.12	0.91	1520	5.40	4.91	0.91	1593	5.20	4.73	0.91	1665
32	20	6.13	4.84	0.79	1520	5.88	4.64	0.79	1611	5.70	4.50	0.79	1647	5.50	4.35	0.79	1720
32	22	6.38	4.27	0.67	1575	6.15	4.12	0.67	1674	6.00	4.02	0.67	1720	5.75	3.85	0.67	1792
32	24	6.70	3.69	0.55	1647	6.45	3.55	0.55	1738	6.30	3.47	0.55	1792	6.10	3.36	0.55	1882
32	26	6.90	2.97	0.43	1738	6.70	2.88	0.43	1828	6.60	2.84	0.43	1882	6.40	2.75	0.43	1937

NOTE Q : Total capacity (kW) SHF : Sensible heat factor DB : Dry-bulb temperature
SHC : Sensible heat capacity (kW) INPUT : Total power input (W) WB : Wet-bulb temperature

PERFORMANCE DATA COOL operation

MS-GA50VB -E1 : MU-GA50VB -E1 (230V)

CAPACITY : 5.0(kW) SHF : 0.65 INPUT : 1810(W)

		OUTDOOR DB(℃)											
INDOOR	INDOOR	35				40				43			
DB(℃)	WB(℃)	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT
21	18	4.90	2.30	0.47	1774	4.50	2.12	0.47	1882	4.33	2.03	0.47	1919
21	20	5.15	1.80	0.35	1846	4.80	1.68	0.35	1937	4.63	1.62	0.35	1991
22	18	4.90	2.50	0.51	1774	4.50	2.30	0.51	1882	4.33	2.21	0.51	1919
22	20	5.15	2.01	0.39	1846	4.80	1.87	0.39	1937	4.63	1.80	0.39	1991
22	22	5.45	1.47	0.27	1919	5.10	1.38	0.27	2027	4.93	1.33	0.27	2063
23	18	4.90	2.70	0.55	1774	4.50	2.48	0.55	1882	4.33	2.38	0.55	1919
23	20	5.15	2.21	0.43	1846	4.80	2.06	0.43	1937	4.63	1.99	0.43	1991
23	22	5.45	1.69	0.31	1919	5.10	1.58	0.31	2027	4.93	1.53	0.31	2063
24	18	4.90	2.89	0.59	1774	4.50	2.66	0.59	1882	4.33	2.55	0.59	1919
24	20	5.15	2.42	0.47	1846	4.80	2.26	0.47	1937	4.63	2.17	0.47	1991
24	22	5.45	1.91	0.35	1919	5.10	1.79	0.35	2027	4.93	1.72	0.35	2063
24	24	5.75	1.32	0.23	1991	5.40	1.24	0.23	2082	5.25	1.21	0.23	2127
25	18	4.90	3.09	0.63	1774	4.50	2.84	0.63	1882	4.33	2.72	0.63	1919
25	20	5.15	2.63	0.51	1846	4.80	2.45	0.51	1937	4.63	2.36	0.51	1991
25	22	5.45	2.13	0.39	1919	5.10	1.99	0.39	2027	4.93	1.92	0.39	2063
25	24	5.75	1.55	0.27	1991	5.40	1.46	0.27	2082	5.25	1.42	0.27	2127
26	18	4.90	3.28	0.67	1774	4.50	3.02	0.67	1882	4.33	2.90	0.67	1919
26	20	5.15	2.83	0.55	1846	4.80	2.64	0.55	1937	4.63	2.54	0.55	1991
26	22	5.45	2.34	0.43	1919	5.10	2.19	0.43	2027	4.93	2.12	0.43	2063
26	24	5.75	1.78	0.31	1991	5.40	1.67	0.31	2082	5.25	1.63	0.31	2127
26	26	6.05	1.15	0.19	2063	5.70	1.08	0.19	2154	5.53	1.05	0.19	2199
27	18	4.90	3.48	0.71	1774	4.50	3.20	0.71	1882	4.33	3.07	0.71	1919
27	20	5.15	3.04	0.59	1846	4.80	2.83	0.59	1937	4.63	2.73	0.59	1991
27	22	5.45	2.56	0.47	1919	5.10	2.40	0.47	2027	4.93	2.31	0.47	2063
27	24	5.75	2.01	0.35	1991	5.40	1.89	0.35	2082	5.25	1.84	0.35	2127
27	26	6.05	1.39	0.23	2063	5.70	1.31	0.23	2154	5.53	1.27	0.23	2199
28	18	4.90	3.68	0.75	1774	4.50	3.38	0.75	1882	4.33	3.24	0.75	1919
28	20	5.15	3.24	0.63	1846	4.80	3.02	0.63	1937	4.63	2.91	0.63	1991
28	22	5.45	2.78	0.51	1919	5.10	2.60	0.51	2027	4.93	2.51	0.51	2063
28	24	5.75	2.24	0.39	1991	5.40	2.11	0.39	2082	5.25	2.05	0.39	2127
28	26	6.05	1.63	0.27	2063	5.70	1.54	0.27	2154	5.53	1.49	0.27	2199
29	18	4.90	3.87	0.79	1774	4.50	3.56	0.79	1882	4.33	3.42	0.79	1919
29	20	5.15	3.45	0.67	1846	4.80	3.22	0.67	1937	4.63	3.10	0.67	1991
29	22	5.45	3.00	0.55	1919	5.10	2.81	0.55	2027	4.93	2.71	0.55	2063
29	24	5.75	2.47	0.43	1991	5.40	2.32	0.43	2082	5.25	2.26	0.43	2127
29	26	6.05	1.88	0.31	2063	5.70	1.77	0.31	2154	5.53	1.71	0.31	2199
30	18	4.90	4.07	0.83	1774	4.50	3.74	0.83	1882	4.33	3.59	0.83	1919
30	20	5.15	3.66	0.71	1846	4.80	3.41	0.71	1937	4.63	3.28	0.71	1991
30	22	5.45	3.22	0.59	1919	5.10	3.01	0.59	2027	4.93	2.91	0.59	2063
30	24	5.75	2.70	0.47	1991	5.40	2.54	0.47	2082	5.25	2.47	0.47	2127
30	26	6.05	2.12	0.35	2063	5.70	2.00	0.35	2154	5.53	1.93	0.35	2199
31	18	4.90	4.26	0.87	1774	4.50	3.92	0.87	1882	4.33	3.76	0.87	1919
31	20	5.15	3.86	0.75	1846	4.80	3.60	0.75	1937	4.63	3.47	0.75	1991
31	22	5.45	3.43	0.63	1919	5.10	3.21	0.63	2027	4.93	3.10	0.63	2063
31	24	5.75	2.93	0.51	1991	5.40	2.75	0.51	2082	5.25	2.68	0.51	2127
31	26	6.05	2.36	0.39	2063	5.70	2.22	0.39	2154	5.53	2.15	0.39	2199
32	18	4.90	4.46	0.91	1774	4.50	4.10	0.91	1882	4.33	3.94	0.91	1919
32	20	5.15	4.07	0.79	1846	4.80	3.79	0.79	1937	4.63	3.65	0.79	1991
32	22	5.45	3.65	0.67	1919	5.10	3.42	0.67	2027	4.93	3.30	0.67	2063
32	24	5.75	3.16	0.55	1991	5.40	2.97	0.55	2082	5.25	2.89	0.55	2127
32	26	6.05	2.60	0.43	2063	5.70	2.45	0.43	2154	5.53	2.38	0.43	2199

NOTE Q : Total capacity (kW) SHF : Sensible heat factor DB : Dry-bulb temperature
SHC : Sensible heat capacity (kW) INPUT : Total power input (W) WB : Wet-bulb temperature

PERFORMANCE DATA COOL operation

MS-GA60VB -E1 : MU-GA60VB -E1 (230V)

CAPACITY : 6.5(kW) SHF : 0.63 INPUT : 2480(W)

		OUTDOOR DB(℃)															
INDOOR	INDOOR	21				25				27				30			
DB(℃)	WB(℃)	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT
21	18	7.64	3.44	0.45	1984	7.31	3.29	0.45	2083	7.02	3.16	0.45	2182	6.76	3.04	0.45	2282
21	20	7.96	2.63	0.33	2083	7.64	2.52	0.33	2207	7.41	2.45	0.33	2257	7.15	2.36	0.33	2356
22	18	7.64	3.74	0.49	1984	7.31	3.58	0.49	2083	7.02	3.44	0.49	2182	6.76	3.31	0.49	2282
22	20	7.96	2.95	0.37	2083	7.64	2.83	0.37	2207	7.41	2.74	0.37	2257	7.15	2.65	0.37	2356
22	22	8.29	2.07	0.25	2158	8.00	2.00	0.25	2294	7.80	1.95	0.25	2356	7.48	1.87	0.25	2455
23	18	7.64	4.05	0.53	1984	7.31	3.88	0.53	2083	7.02	3.72	0.53	2182	6.76	3.58	0.53	2282
23	20	7.96	3.26	0.41	2083	7.64	3.13	0.41	2207	7.41	3.04	0.41	2257	7.15	2.93	0.41	2356
23	22	8.29	2.40	0.29	2158	8.00	2.32	0.29	2294	7.80	2.26	0.29	2356	7.48	2.17	0.29	2455
24	18	7.64	4.35	0.57	1984	7.31	4.17	0.57	2083	7.02	4.00	0.57	2182	6.76	3.85	0.57	2282
24	20	7.96	3.58	0.45	2083	7.64	3.44	0.45	2207	7.41	3.33	0.45	2257	7.15	3.22	0.45	2356
24	22	8.29	2.73	0.33	2158	8.00	2.64	0.33	2294	7.80	2.57	0.33	2356	7.48	2.47	0.33	2455
24	24	8.71	1.83	0.21	2257	8.39	1.76	0.21	2381	8.19	1.72	0.21	2455	7.93	1.67	0.21	2579
25	18	7.64	4.66	0.61	1984	7.31	4.46	0.61	2083	7.02	4.28	0.61	2182	6.76	4.12	0.61	2282
25	20	7.96	3.90	0.49	2083	7.64	3.74	0.49	2207	7.41	3.63	0.49	2257	7.15	3.50	0.49	2356
25	22	8.29	3.07	0.37	2158	8.00	2.96	0.37	2294	7.80	2.89	0.37	2356	7.48	2.77	0.37	2455
25	24	8.71	2.18	0.25	2257	8.39	2.10	0.25	2381	8.19	2.05	0.25	2455	7.93	1.98	0.25	2579
26	18	7.64	4.96	0.65	1984	7.31	4.75	0.65	2083	7.02	4.56	0.65	2182	6.76	4.39	0.65	2282
26	20	7.96	4.22	0.53	2083	7.64	4.05	0.53	2207	7.41	3.93	0.53	2257	7.15	3.79	0.53	2356
26	22	8.29	3.40	0.41	2158	8.00	3.28	0.41	2294	7.80	3.20	0.41	2356	7.48	3.06	0.41	2455
26	24	8.71	2.53	0.29	2257	8.39	2.43	0.29	2381	8.19	2.38	0.29	2455	7.93	2.30	0.29	2579
26	26	8.97	1.52	0.17	2381	8.71	1.48	0.17	2505	8.58	1.46	0.17	2579	8.32	1.41	0.17	2654
27	18	7.64	5.27	0.69	1984	7.31	5.05	0.69	2083	7.02	4.84	0.69	2182	6.76	4.66	0.69	2282
27	20	7.96	4.54	0.57	2083	7.64	4.35	0.57	2207	7.41	4.22	0.57	2257	7.15	4.08	0.57	2356
27	22	8.29	3.73	0.45	2158	8.00	3.60	0.45	2294	7.80	3.51	0.45	2356	7.48	3.36	0.45	2455
27	24	8.71	2.87	0.33	2257	8.39	2.77	0.33	2381	8.19	2.70	0.33	2455	7.93	2.62	0.33	2579
27	26	8.97	1.88	0.21	2381	8.71	1.83	0.21	2505	8.58	1.80	0.21	2579	8.32	1.75	0.21	2654
28	18	7.64	5.58	0.73	1984	7.31	5.34	0.73	2083	7.02	5.12	0.73	2182	6.76	4.93	0.73	2282
28	20	7.96	4.86	0.61	2083	7.64	4.66	0.61	2207	7.41	4.52	0.61	2257	7.15	4.36	0.61	2356
28	22	8.29	4.06	0.49	2158	8.00	3.92	0.49	2294	7.80	3.82	0.49	2356	7.48	3.66	0.49	2455
28	24	8.71	3.22	0.37	2257	8.39	3.10	0.37	2381	8.19	3.03	0.37	2455	7.93	2.93	0.37	2579
28	26	8.97	2.24	0.25	2381	8.71	2.18	0.25	2505	8.58	2.15	0.25	2579	8.32	2.08	0.25	2654
29	18	7.64	5.88	0.77	1984	7.31	5.63	0.77	2083	7.02	5.41	0.77	2182	6.76	5.21	0.77	2282
29	20	7.96	5.18	0.65	2083	7.64	4.96	0.65	2207	7.41	4.82	0.65	2257	7.15	4.65	0.65	2356
29	22	8.29	4.39	0.53	2158	8.00	4.24	0.53	2294	7.80	4.13	0.53	2356	7.48	3.96	0.53	2455
29	24	8.71	3.57	0.41	2257	8.39	3.44	0.41	2381	8.19	3.36	0.41	2455	7.93	3.25	0.41	2579
29	26	8.97	2.60	0.29	2381	8.71	2.53	0.29	2505	8.58	2.49	0.29	2579	8.32	2.41	0.29	2654
30	18	7.64	6.19	0.81	1984	7.31	5.92	0.81	2083	7.02	5.69	0.81	2182	6.76	5.48	0.81	2282
30	20	7.96	5.49	0.69	2083	7.64	5.27	0.69	2207	7.41	5.11	0.69	2257	7.15	4.93	0.69	2356
30	22	8.29	4.72	0.57	2158	8.00	4.56	0.57	2294	7.80	4.45	0.57	2356	7.48	4.26	0.57	2455
30	24	8.71	3.92	0.45	2257	8.39	3.77	0.45	2381	8.19	3.69	0.45	2455	7.93	3.57	0.45	2579
30	26	8.97	2.96	0.33	2381	8.71	2.87	0.33	2505	8.58	2.83	0.33	2579	8.32	2.75	0.33	2654
31	18	7.64	6.49	0.85	1984	7.31	6.22	0.85	2083	7.02	5.97	0.85	2182	6.76	5.75	0.85	2282
31	20	7.96	5.81	0.73	2083	7.64	5.58	0.73	2207	7.41	5.41	0.73	2257	7.15	5.22	0.73	2356
31	22	8.29	5.06	0.61	2158	8.00	4.88	0.61	2294	7.80	4.76	0.61	2356	7.48	4.56	0.61	2455
31	24	8.71	4.27	0.49	2257	8.39	4.11	0.49	2381	8.19	4.01	0.49	2455	7.93	3.89	0.49	2579
31	26	8.97	3.32	0.37	2381	8.71	3.22	0.37	2505	8.58	3.17	0.37	2579	8.32	3.08	0.37	2654
32	18	7.64	6.80	0.89	1984	7.31	6.51	0.89	2083	7.02	6.25	0.89	2182	6.76	6.02	0.89	2282
32	20	7.96	6.13	0.77	2083	7.64	5.88	0.77	2207	7.41	5.71	0.77	2257	7.15	5.51	0.77	2356
32	22	8.29	5.39	0.65	2158	8.00	5.20	0.65	2294	7.80	5.07	0.65	2356	7.48	4.86	0.65	2455
32	24	8.71	4.62	0.53	2257	8.39	4.44	0.53	2381	8.19	4.34	0.53	2455	7.93	4.20	0.53	2579
32	26	8.97	3.68	0.41	2381	8.71	3.57	0.41	2505	8.58	3.52	0.41	2579	8.32	3.41	0.41	2654

NOTE Q : Total capacity (kW) SHF : Sensible heat factor DB : Dry-bulb temperature
SHC : Sensible heat capacity (kW) INPUT : Total power input (W) WB : Wet-bulb temperature

PERFORMANCE DATA COOL operation

MS-GA60VB -E1 : MU-GA60VB -E1 (230V)

CAPACITY : 6.5(kW) SHF : 0.63 INPUT : 2480(W)

		OUTDOOR DB(℃)											
INDOOR	INDOOR	35				40				43			
DB(℃)	WB(℃)	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT
21	18	6.37	2.87	0.45	2430	5.85	2.63	0.45	2579	5.62	2.53	0.45	2629
21	20	6.70	2.21	0.33	2530	6.24	2.06	0.33	2654	6.01	1.98	0.33	2728
22	18	6.37	3.12	0.49	2430	5.85	2.87	0.49	2579	5.62	2.76	0.49	2629
22	20	6.70	2.48	0.37	2530	6.24	2.31	0.37	2654	6.01	2.22	0.37	2728
22	22	7.09	1.77	0.25	2629	6.63	1.66	0.25	2778	6.40	1.60	0.25	2827
23	18	6.37	3.38	0.53	2430	5.85	3.10	0.53	2579	5.62	2.98	0.53	2629
23	20	6.70	2.74	0.41	2530	6.24	2.56	0.41	2654	6.01	2.47	0.41	2728
23	22	7.09	2.05	0.29	2629	6.63	1.92	0.29	2778	6.40	1.86	0.29	2827
24	18	6.37	3.63	0.57	2430	5.85	3.33	0.57	2579	5.62	3.20	0.57	2629
24	20	6.70	3.01	0.45	2530	6.24	2.81	0.45	2654	6.01	2.71	0.45	2728
24	22	7.09	2.34	0.33	2629	6.63	2.19	0.33	2778	6.40	2.11	0.33	2827
24	24	7.48	1.57	0.21	2728	7.02	1.47	0.21	2852	6.83	1.43	0.21	2914
25	18	6.37	3.89	0.61	2430	5.85	3.57	0.61	2579	5.62	3.43	0.61	2629
25	20	6.70	3.28	0.49	2530	6.24	3.06	0.49	2654	6.01	2.95	0.49	2728
25	22	7.09	2.62	0.37	2629	6.63	2.45	0.37	2778	6.40	2.37	0.37	2827
25	24	7.48	1.87	0.25	2728	7.02	1.76	0.25	2852	6.83	1.71	0.25	2914
26	18	6.37	4.14	0.65	2430	5.85	3.80	0.65	2579	5.62	3.65	0.65	2629
26	20	6.70	3.55	0.53	2530	6.24	3.31	0.53	2654	6.01	3.19	0.53	2728
26	22	7.09	2.90	0.41	2629	6.63	2.72	0.41	2778	6.40	2.63	0.41	2827
26	24	7.48	2.17	0.29	2728	7.02	2.04	0.29	2852	6.83	1.98	0.29	2914
26	26	7.87	1.34	0.17	2827	7.41	1.26	0.17	2951	7.18	1.22	0.17	3013
27	18	6.37	4.40	0.69	2430	5.85	4.04	0.69	2579	5.62	3.88	0.69	2629
27	20	6.70	3.82	0.57	2530	6.24	3.56	0.57	2654	6.01	3.43	0.57	2728
27	22	7.09	3.19	0.45	2629	6.63	2.98	0.45	2778	6.40	2.88	0.45	2827
27	24	7.48	2.47	0.33	2728	7.02	2.32	0.33	2852	6.83	2.25	0.33	2914
27	26	7.87	1.65	0.21	2827	7.41	1.56	0.21	2951	7.18	1.51	0.21	3013
28	18	6.37	4.65	0.73	2430	5.85	4.27	0.73	2579	5.62	4.10	0.73	2629
28	20	6.70	4.08	0.61	2530	6.24	3.81	0.61	2654	6.01	3.67	0.61	2728
28	22	7.09	3.47	0.49	2629	6.63	3.25	0.49	2778	6.40	3.14	0.49	2827
28	24	7.48	2.77	0.37	2728	7.02	2.60	0.37	2852	6.83	2.53	0.37	2914
28	26	7.87	1.97	0.25	2827	7.41	1.85	0.25	2951	7.18	1.80	0.25	3013
29	18	6.37	4.90	0.77	2430	5.85	4.50	0.77	2579	5.62	4.33	0.77	2629
29	20	6.70	4.35	0.65	2530	6.24	4.06	0.65	2654	6.01	3.91	0.65	2728
29	22	7.09	3.76	0.53	2629	6.63	3.51	0.53	2778	6.40	3.39	0.53	2827
29	24	7.48	3.06	0.41	2728	7.02	2.88	0.41	2852	6.83	2.80	0.41	2914
29	26	7.87	2.28	0.29	2827	7.41	2.15	0.29	2951	7.18	2.08	0.29	3013
30	18	6.37	5.16	0.81	2430	5.85	4.74	0.81	2579	5.62	4.55	0.81	2629
30	20	6.70	4.62	0.69	2530	6.24	4.31	0.69	2654	6.01	4.15	0.69	2728
30	22	7.09	4.04	0.57	2629	6.63	3.78	0.57	2778	6.40	3.65	0.57	2827
30	24	7.48	3.36	0.45	2728	7.02	3.16	0.45	2852	6.83	3.07	0.45	2914
30	26	7.87	2.60	0.33	2827	7.41	2.45	0.33	2951	7.18	2.37	0.33	3013
31	18	6.37	5.41	0.85	2430	5.85	4.97	0.85	2579	5.62	4.78	0.85	2629
31	20	6.70	4.89	0.73	2530	6.24	4.56	0.73	2654	6.01	4.39	0.73	2728
31	22	7.09	4.32	0.61	2629	6.63	4.04	0.61	2778	6.40	3.91	0.61	2827
31	24	7.48	3.66	0.49	2728	7.02	3.44	0.49	2852	6.83	3.34	0.49	2914
31	26	7.87	2.91	0.37	2827	7.41	2.74	0.37	2951	7.18	2.66	0.37	3013
32	18	6.37	5.67	0.89	2430	5.85	5.21	0.89	2579	5.62	5.00	0.89	2629
32	20	6.70	5.16	0.77	2530	6.24	4.80	0.77	2654	6.01	4.63	0.77	2728
32	22	7.09	4.61	0.65	2629	6.63	4.31	0.65	2778	6.40	4.16	0.65	2827
32	24	7.48	3.96	0.53	2728	7.02	3.72	0.53	2852	6.83	3.62	0.53	2914
32	26	7.87	3.22	0.41	2827	7.41	3.04	0.41	2951	7.18	2.94	0.41	3013

NOTE Q : Total capacity (kW) SHF : Sensible heat factor DB : Dry-bulb temperature
SHC : Sensible heat capacity (kW) INPUT : Total power input (W) WB : Wet-bulb temperature

PERFORMANCE DATA COOL operation

MS-GA80VB -E1 : MU-GA80VB -E1 (230V)

CAPACITY : 8.5(kW) SHF : 0.62 INPUT : 3260(W)

		OUTDOOR DB(℃)															
INDOOR	INDOOR	21				25				27				30			
DB(℃)	WB(℃)	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT
21	18	9.99	4.39	0.44	2608	9.56	4.21	0.44	2738	9.18	4.04	0.44	2869	8.84	3.89	0.44	2999
21	20	10.41	3.33	0.32	2738	9.99	3.20	0.32	2901	9.69	3.10	0.32	2967	9.35	2.99	0.32	3097
22	18	9.99	4.79	0.48	2608	9.56	4.59	0.48	2738	9.18	4.41	0.48	2869	8.84	4.24	0.48	2999
22	20	10.41	3.75	0.36	2738	9.99	3.60	0.36	2901	9.69	3.49	0.36	2967	9.35	3.37	0.36	3097
22	22	10.84	2.60	0.24	2836	10.46	2.51	0.24	3016	10.20	2.45	0.24	3097	9.78	2.35	0.24	3227
23	18	9.99	5.19	0.52	2608	9.56	4.97	0.52	2738	9.18	4.77	0.52	2869	8.84	4.60	0.52	2999
23	20	10.41	4.17	0.40	2738	9.99	4.00	0.40	2901	9.69	3.88	0.40	2967	9.35	3.74	0.40	3097
23	22	10.84	3.03	0.28	2836	10.46	2.93	0.28	3016	10.20	2.86	0.28	3097	9.78	2.74	0.28	3227
24	18	9.99	5.59	0.56	2608	9.56	5.36	0.56	2738	9.18	5.14	0.56	2869	8.84	4.95	0.56	2999
24	20	10.41	4.58	0.44	2738	9.99	4.39	0.44	2901	9.69	4.26	0.44	2967	9.35	4.11	0.44	3097
24	22	10.84	3.47	0.32	2836	10.46	3.35	0.32	3016	10.20	3.26	0.32	3097	9.78	3.13	0.32	3227
24	24	11.39	2.28	0.20	2967	10.97	2.19	0.20	3130	10.71	2.14	0.20	3227	10.37	2.07	0.20	3390
25	18	9.99	5.99	0.60	2608	9.56	5.74	0.60	2738	9.18	5.51	0.60	2869	8.84	5.30	0.60	2999
25	20	10.41	5.00	0.48	2738	9.99	4.79	0.48	2901	9.69	4.65	0.48	2967	9.35	4.49	0.48	3097
25	22	10.84	3.90	0.36	2836	10.46	3.76	0.36	3016	10.20	3.67	0.36	3097	9.78	3.52	0.36	3227
25	24	11.39	2.73	0.24	2967	10.97	2.63	0.24	3130	10.71	2.57	0.24	3227	10.37	2.49	0.24	3390
26	18	9.99	6.39	0.64	2608	9.56	6.12	0.64	2738	9.18	5.88	0.64	2869	8.84	5.66	0.64	2999
26	20	10.41	5.41	0.52	2738	9.99	5.19	0.52	2901	9.69	5.04	0.52	2967	9.35	4.86	0.52	3097
26	22	10.84	4.34	0.40	2836	10.46	4.18	0.40	3016	10.20	4.08	0.40	3097	9.78	3.91	0.40	3227
26	24	11.39	3.19	0.28	2967	10.97	3.07	0.28	3130	10.71	3.00	0.28	3227	10.37	2.90	0.28	3390
26	26	11.73	1.88	0.16	3130	11.39	1.82	0.16	3293	11.22	1.80	0.16	3390	10.88	1.74	0.16	3488
27	18	9.99	6.79	0.68	2608	9.56	6.50	0.68	2738	9.18	6.24	0.68	2869	8.84	6.01	0.68	2999
27	20	10.41	5.83	0.56	2738	9.99	5.59	0.56	2901	9.69	5.43	0.56	2967	9.35	5.24	0.56	3097
27	22	10.84	4.77	0.44	2836	10.46	4.60	0.44	3016	10.20	4.49	0.44	3097	9.78	4.30	0.44	3227
27	24	11.39	3.64	0.32	2967	10.97	3.51	0.32	3130	10.71	3.43	0.32	3227	10.37	3.32	0.32	3390
27	26	11.73	2.35	0.20	3130	11.39	2.28	0.20	3293	11.22	2.24	0.20	3390	10.88	2.18	0.20	3488
28	18	9.99	7.19	0.72	2608	9.56	6.89	0.72	2738	9.18	6.61	0.72	2869	8.84	6.36	0.72	2999
28	20	10.41	6.25	0.60	2738	9.99	5.99	0.60	2901	9.69	5.81	0.60	2967	9.35	5.61	0.60	3097
28	22	10.84	5.20	0.48	2836	10.46	5.02	0.48	3016	10.20	4.90	0.48	3097	9.78	4.69	0.48	3227
28	24	11.39	4.10	0.36	2967	10.97	3.95	0.36	3130	10.71	3.86	0.36	3227	10.37	3.73	0.36	3390
28	26	11.73	2.82	0.24	3130	11.39	2.73	0.24	3293	11.22	2.69	0.24	3390	10.88	2.61	0.24	3488
29	18	9.99	7.59	0.76	2608	9.56	7.27	0.76	2738	9.18	6.98	0.76	2869	8.84	6.72	0.76	2999
29	20	10.41	6.66	0.64	2738	9.99	6.39	0.64	2901	9.69	6.20	0.64	2967	9.35	5.98	0.64	3097
29	22	10.84	5.64	0.52	2836	10.46	5.44	0.52	3016	10.20	5.30	0.52	3097	9.78	5.08	0.52	3227
29	24	11.39	4.56	0.40	2967	10.97	4.39	0.40	3130	10.71	4.28	0.40	3227	10.37	4.15	0.40	3390
29	26	11.73	3.28	0.28	3130	11.39	3.19	0.28	3293	11.22	3.14	0.28	3390	10.88	3.05	0.28	3488
30	18	9.99	7.99	0.80	2608	9.56	7.65	0.80	2738	9.18	7.34	0.80	2869	8.84	7.07	0.80	2999
30	20	10.41	7.08	0.68	2738	9.99	6.79	0.68	2901	9.69	6.59	0.68	2967	9.35	6.36	0.68	3097
30	22	10.84	6.07	0.56	2836	10.46	5.85	0.56	3016	10.20	5.71	0.56	3097	9.78	5.47	0.56	3227
30	24	11.39	5.01	0.44	2967	10.97	4.82	0.44	3130	10.71	4.71	0.44	3227	10.37	4.56	0.44	3390
30	26	11.73	3.75	0.32	3130	11.39	3.64	0.32	3293	11.22	3.59	0.32	3390	10.88	3.48	0.32	3488
31	18	9.99	8.39	0.84	2608	9.56	8.03	0.84	2738	9.18	7.71	0.84	2869	8.84	7.43	0.84	2999
31	20	10.41	7.50	0.72	2738	9.99	7.19	0.72	2901	9.69	6.98	0.72	2967	9.35	6.73	0.72	3097
31	22	10.84	6.50	0.60	2836	10.46	6.27	0.60	3016	10.20	6.12	0.60	3097	9.78	5.87	0.60	3227
31	24	11.39	5.47	0.48	2967	10.97	5.26	0.48	3130	10.71	5.14	0.48	3227	10.37	4.98	0.48	3390
31	26	11.73	4.22	0.36	3130	11.39	4.10	0.36	3293	11.22	4.04	0.36	3390	10.88	3.92	0.36	3488
32	18	9.99	8.79	0.88	2608	9.56	8.42	0.88	2738	9.18	8.08	0.88	2869	8.84	7.78	0.88	2999
32	20	10.41	7.91	0.76	2738	9.99	7.59	0.76	2901	9.69	7.36	0.76	2967	9.35	7.11	0.76	3097
32	22	10.84	6.94	0.64	2836	10.46	6.69	0.64	3016	10.20	6.53	0.64	3097	9.78	6.26	0.64	3227
32	24	11.39	5.92	0.52	2967	10.97	5.70	0.52	3130	10.71	5.57	0.52	3227	10.37	5.39	0.52	3390
32	26	11.73	4.69	0.40	3130	11.39	4.56	0.40	3293	11.22	4.49	0.40	3390	10.88	4.35	0.40	3488

NOTE Q : Total capacity (kW) SHF : Sensible heat factor DB : Dry-bulb temperature
SHC : Sensible heat capacity (kW) INPUT : Total power input (W) WB : Wet-bulb temperature

PERFORMANCE DATA COOL operation

MS-GA80VB -E1 : MU-GA80VB -E1 (230V)

CAPACITY : 8.5(kW) SHF : 0.62 INPUT : 3260(W)

		OUTDOOR DB(℃)											
INDOOR	INDOOR	35				40				43			
DB(℃)	WB(℃)	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT
21	18	8.33	3.67	0.44	3195	7.65	3.37	0.44	3390	7.35	3.24	0.44	3456
21	20	8.76	2.80	0.32	3325	8.16	2.61	0.32	3488	7.86	2.52	0.32	3586
22	18	8.33	4.00	0.48	3195	7.65	3.67	0.48	3390	7.35	3.53	0.48	3456
22	20	8.76	3.15	0.36	3325	8.16	2.94	0.36	3488	7.86	2.83	0.36	3586
22	22	9.27	2.22	0.24	3456	8.67	2.08	0.24	3651	8.37	2.01	0.24	3716
23	18	8.33	4.33	0.52	3195	7.65	3.98	0.52	3390	7.35	3.82	0.52	3456
23	20	8.76	3.50	0.40	3325	8.16	3.26	0.40	3488	7.86	3.15	0.40	3586
23	22	9.27	2.59	0.28	3456	8.67	2.43	0.28	3651	8.37	2.34	0.28	3716
24	18	8.33	4.66	0.56	3195	7.65	4.28	0.56	3390	7.35	4.12	0.56	3456
24	20	8.76	3.85	0.44	3325	8.16	3.59	0.44	3488	7.86	3.46	0.44	3586
24	22	9.27	2.96	0.32	3456	8.67	2.77	0.32	3651	8.37	2.68	0.32	3716
24	24	9.78	1.96	0.20	3586	9.18	1.84	0.20	3749	8.93	1.79	0.20	3831
25	18	8.33	5.00	0.60	3195	7.65	4.59	0.60	3390	7.35	4.41	0.60	3456
25	20	8.76	4.20	0.48	3325	8.16	3.92	0.48	3488	7.86	3.77	0.48	3586
25	22	9.27	3.34	0.36	3456	8.67	3.12	0.36	3651	8.37	3.01	0.36	3716
25	24	9.78	2.35	0.24	3586	9.18	2.20	0.24	3749	8.93	2.14	0.24	3831
26	18	8.33	5.33	0.64	3195	7.65	4.90	0.64	3390	7.35	4.71	0.64	3456
26	20	8.76	4.55	0.52	3325	8.16	4.24	0.52	3488	7.86	4.09	0.52	3586
26	22	9.27	3.71	0.40	3456	8.67	3.47	0.40	3651	8.37	3.35	0.40	3716
26	24	9.78	2.74	0.28	3586	9.18	2.57	0.28	3749	8.93	2.50	0.28	3831
26	26	10.29	1.65	0.16	3716	9.69	1.55	0.16	3879	9.39	1.50	0.16	3961
27	18	8.33	5.66	0.68	3195	7.65	5.20	0.68	3390	7.35	5.00	0.68	3456
27	20	8.76	4.90	0.56	3325	8.16	4.57	0.56	3488	7.86	4.40	0.56	3586
27	22	9.27	4.08	0.44	3456	8.67	3.81	0.44	3651	8.37	3.68	0.44	3716
27	24	9.78	3.13	0.32	3586	9.18	2.94	0.32	3749	8.93	2.86	0.32	3831
27	26	10.29	2.06	0.20	3716	9.69	1.94	0.20	3879	9.39	1.88	0.20	3961
28	18	8.33	6.00	0.72	3195	7.65	5.51	0.72	3390	7.35	5.29	0.72	3456
28	20	8.76	5.25	0.60	3325	8.16	4.90	0.60	3488	7.86	4.72	0.60	3586
28	22	9.27	4.45	0.48	3456	8.67	4.16	0.48	3651	8.37	4.02	0.48	3716
28	24	9.78	3.52	0.36	3586	9.18	3.30	0.36	3749	8.93	3.21	0.36	3831
28	26	10.29	2.47	0.24	3716	9.69	2.33	0.24	3879	9.39	2.25	0.24	3961
29	18	8.33	6.33	0.76	3195	7.65	5.81	0.76	3390	7.35	5.59	0.76	3456
29	20	8.76	5.60	0.64	3325	8.16	5.22	0.64	3488	7.86	5.03	0.64	3586
29	22	9.27	4.82	0.52	3456	8.67	4.51	0.52	3651	8.37	4.35	0.52	3716
29	24	9.78	3.91	0.40	3586	9.18	3.67	0.40	3749	8.93	3.57	0.40	3831
29	26	10.29	2.88	0.28	3716	9.69	2.71	0.28	3879	9.39	2.63	0.28	3961
30	18	8.33	6.66	0.80	3195	7.65	6.12	0.80	3390	7.35	5.88	0.80	3456
30	20	8.76	5.95	0.68	3325	8.16	5.55	0.68	3488	7.86	5.35	0.68	3586
30	22	9.27	5.19	0.56	3456	8.67	4.86	0.56	3651	8.37	4.69	0.56	3716
30	24	9.78	4.30	0.44	3586	9.18	4.04	0.44	3749	8.93	3.93	0.44	3831
30	26	10.29	3.29	0.32	3716	9.69	3.10	0.32	3879	9.39	3.01	0.32	3961
31	18	8.33	7.00	0.84	3195	7.65	6.43	0.84	3390	7.35	6.18	0.84	3456
31	20	8.76	6.30	0.72	3325	8.16	5.88	0.72	3488	7.86	5.66	0.72	3586
31	22	9.27	5.56	0.60	3456	8.67	5.20	0.60	3651	8.37	5.02	0.60	3716
31	24	9.78	4.69	0.48	3586	9.18	4.41	0.48	3749	8.93	4.28	0.48	3831
31	26	10.29	3.70	0.36	3716	9.69	3.49	0.36	3879	9.39	3.38	0.36	3961
32	18	8.33	7.33	0.88	3195	7.65	6.73	0.88	3390	7.35	6.47	0.88	3456
32	20	8.76	6.65	0.76	3325	8.16	6.20	0.76	3488	7.86	5.98	0.76	3586
32	22	9.27	5.93	0.64	3456	8.67	5.55	0.64	3651	8.37	5.36	0.64	3716
32	24	9.78	5.08	0.52	3586	9.18	4.77	0.52	3749	8.93	4.64	0.52	3831
32	26	10.29	4.11	0.40	3716	9.69	3.88	0.40	3879	9.39	3.76	0.40	3961

NOTE Q : Total capacity (kW) SHF : Sensible heat factor DB : Dry-bulb temperature
SHC : Sensible heat capacity (kW) INPUT : Total power input (W) WB : Wet-bulb temperature

9 TROUBLESHOOTING

MU-GA50VB -E1
MU-GA60VB -E1
MU-GA80VB -E1

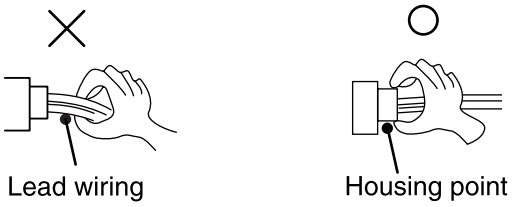
9-1. Cautions on troubleshooting

1. Before troubleshooting, check the following:

(1) Check the power supply voltage.
(2) Check the indoor/outdoor connecting wire for mis-wiring.

2. Take care the following during servicing.

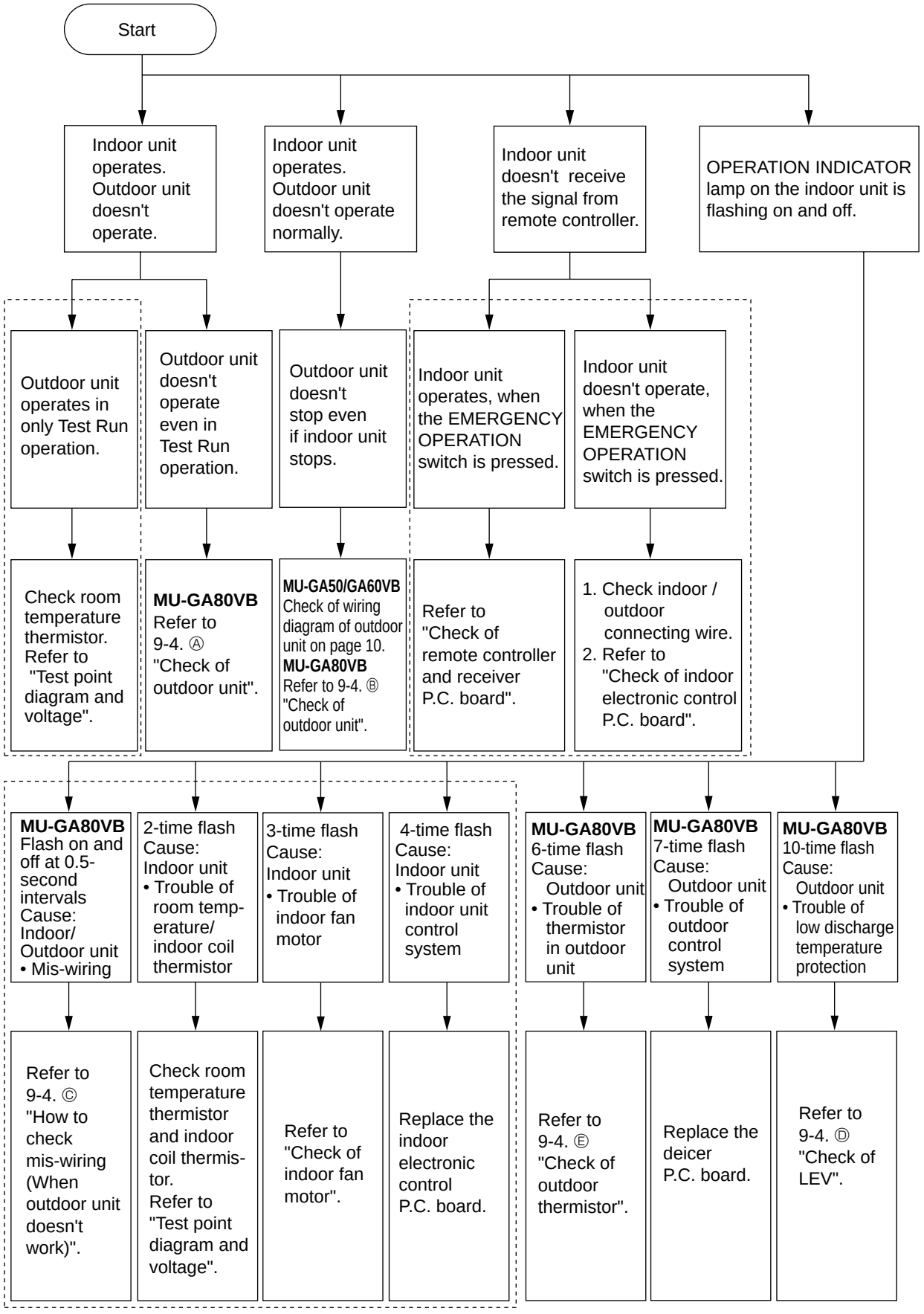
(1) Before servicing the air conditioner, be sure to first turn off the remote controller to stop the main unit, and then after confirming the horizontal vane is closed, turn off the breaker and / or disconnect the power plug.
(2) Be sure to turn OFF the power supply before removing the front panel, the cabinet, the top panel, and the electronic control P.C. board.
(3) When removing the electronic control P.C. board, hold the edge of the board with care NOT to apply stress on the components.
(4) When connecting or disconnecting the connectors, hold the housing of the connector. DO NOT pull the lead wires.



3. Troubleshooting procedure

(1) First, check if the OPERATION INDICATOR lamp on the indoor unit is flashing on and off to indicate an abnormality. To make sure, check how many times the abnormality indication is flashing on and off before starting service work.
(2) Before servicing that the connector and terminal are connected properly.
(3) If the electronic control P.C. board is supposed to be defective, check the copper foil pattern for disconnection and the components for bursting and discoloration.
(4) When troubleshooting, refer to 9-2..

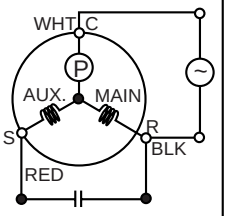
9-2. Instruction of troubleshooting


Start
Indoor unit operates. Outdoor unit doesn't operate.
Indoor unit operates. Outdoor unit doesn't operate normally.
Indoor unit doesn't receive the signal from remote controller.
OPERATION INDICATOR lamp on the indoor unit is flashing on and off.
Outdoor unit operates in only Test Run operation.
Outdoor unit doesn't operate even in Test Run operation.
Outdoor unit doesn't stop even if indoor unit stops.
Indoor unit operates, when the EMERGENCY OPERATION switch is pressed.
Indoor unit doesn't operate, when the EMERGENCY OPERATION switch is pressed.
Check room temperature thermistor. Refer to "Test point diagram and voltage".
MU-GA80VB Refer to 9-4. Ⓐ "Check of outdoor unit".
MU-GA50/GA60VB Check of wiring diagram of outdoor unit on page 10.
MU-GA80VB Refer to 9-4. Ⓑ "Check of outdoor unit".
Refer to "Check of remote controller and receiver P.C. board".
1. Check indoor / outdoor connecting wire.
2. Refer to "Check of indoor electronic control P.C. board".
MU-GA80VB Flash on and off at 0.5-second intervals Cause: Indoor/ Outdoor unit • Mis-wiring
2-time flash Cause: Indoor unit • Trouble of room temperature/ indoor coil thermistor
3-time flash Cause: Indoor unit • Trouble of indoor fan motor
4-time flash Cause: Indoor unit • Trouble of indoor unit control system
MU-GA80VB 6-time flash Cause: Outdoor unit • Trouble of thermistor in outdoor unit
MU-GA80VB 7-time flash Cause: Outdoor unit • Trouble of outdoor control system
MU-GA80VB 10-time flash Cause: Outdoor unit • Trouble of low discharge temperature protection
Refer to 9-4. Ⓒ "How to check mis-wiring (When outdoor unit doesn't work)".
Check room temperature thermistor and indoor coil thermistor. Refer to "Test point diagram and voltage".
Refer to "Check of indoor fan motor".
Replace the indoor electronic control P.C. board.
Refer to 9-4. Ⓔ "Check of outdoor thermistor".
Replace the deicer P.C. board.
Refer to 9-4. Ⓓ "Check of LEV".

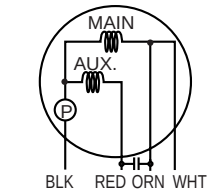
As for indoor unit, refer to service manual OB369.

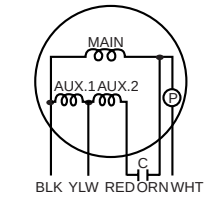
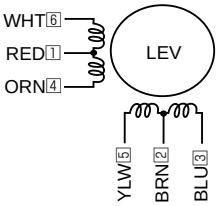
9-3. Trouble criterion of main parts

MU-GA50VB -E1 MU-GA60VB -E1 MU-GA80VB -E1

<table>
<tr><th>Part name</th><th>Check method and criterion</th><th>Figure</th></tr>
<tr><td>Discharge temperature thermistor(RT62)
MU-GA80VB</td><td>Measure the resistance with a tester.
Before measurement, hold the thermistor with your hands to warm it up.
(Part temperature 0˚C ~ 40˚C)
<table><tr><th>Normal</th><th>Abnormal</th></tr><tr><td>120 kΩ ~ 800kΩ</td><td>Open or short-circuit</td></tr></table></td><td></td></tr>
<tr><td>Ambient temperature thermistor(RT63)
MU-GA80VB</td><td>Measure the resistance with a tester.
(Part temperature –10˚C ~ 40˚C)
<table><tr><th>Normal</th><th>Abnormal</th></tr><tr><td>5 kΩ ~ 60 kΩ</td><td>Open or short-circuit</td></tr></table></td><td></td></tr>
<tr><td>Compressor
(MC)
INNER
PROTECTOR
160± 5℃ OPEN
90±10℃ CLOSE</td><td>Measure the resistance between the terminals with a tester.
(Part temperature –10˚C ~ 40˚C)
<table><tr><th rowspan="2">Terminal</th><th colspan="3">Normal</th><th rowspan="2">Abnormal</th></tr><tr><th>MU-GA50VB</th><th>MU-GA60VB</th><th>MU-GA80VB</th></tr><tr><td>C – R</td><td>1.59 Ω ~ 1.95 Ω</td><td>0.71 Ω ~ 0.87 Ω</td><td>0.56 Ω ~ 0.71 Ω</td><td rowspan="2">Open or short-circuit</td></tr><tr><td>C – S</td><td>2.65 Ω ~ 3.24 Ω</td><td>1.45 Ω ~ 1.77 Ω</td><td>1.43 Ω ~ 1.76 Ω</td></tr></table></td><td> 
</td></tr>
<tr><td>Outdoor fan motor(MF)
INNER
PROTECTOR

MU-GA50VB
MU-GA60VB
130± 5℃ OPEN
(83±15℃ CLOSE※)

MU-GA80VB
135± 5℃ OPEN
(87±15℃ CLOSE※)</td><td>Measure the resistance between the terminals with a tester.
(Part temperature –10˚C ~ 40˚C)
<table><tr><th rowspan="2">Color of lead wire</th><th colspan="3">Normal</th><th>Abnormal</th></tr><tr><th>MU-GA50VB</th><th>MU-GA60VB</th><th>MU-GA80VB</th><th rowspan="5">Open or short-circuit</th></tr><tr><td>WHT – BLK</td><td>70.4 Ω ~ 85.5 Ω</td><td>63 Ω ~ 77 Ω</td><td>55 Ω ~ 68 Ω</td></tr><tr><td>BLK – RED</td><td>73.6 Ω ~ 89.3 Ω</td><td>79 Ω ~ 96 Ω</td><td>–</td></tr><tr><td>BLK – YLW</td><td>–</td><td>–</td><td>49 Ω ~ 61 Ω</td></tr><tr><td>YLW – RED</td><td>–</td><td>–</td><td>22 Ω ~ 29 Ω</td></tr></table></td><td>MU-GA50VB/GA60VB
 

MU-GA80VB
 
</td></tr>
<tr><td>LEV(Expansion valve)
MU-GA80VB</td><td>Measure the resistance with a tester.
(Part temperature : –10˚C ~ 40˚C)
<table><tr><th>Color of lead wire</th><th>Normal</th><th>Abnormal</th></tr><tr><td>WHT – RED</td><td rowspan="4">41.0 Ω ~ 49.0 Ω</td><td rowspan="4">Open or short-circuit</td></tr><tr><td>RED – ORN</td></tr><tr><td>YLW – BRN</td></tr><tr><td>BRN – BLU</td></tr></table></td><td> 
</td></tr>
</table>

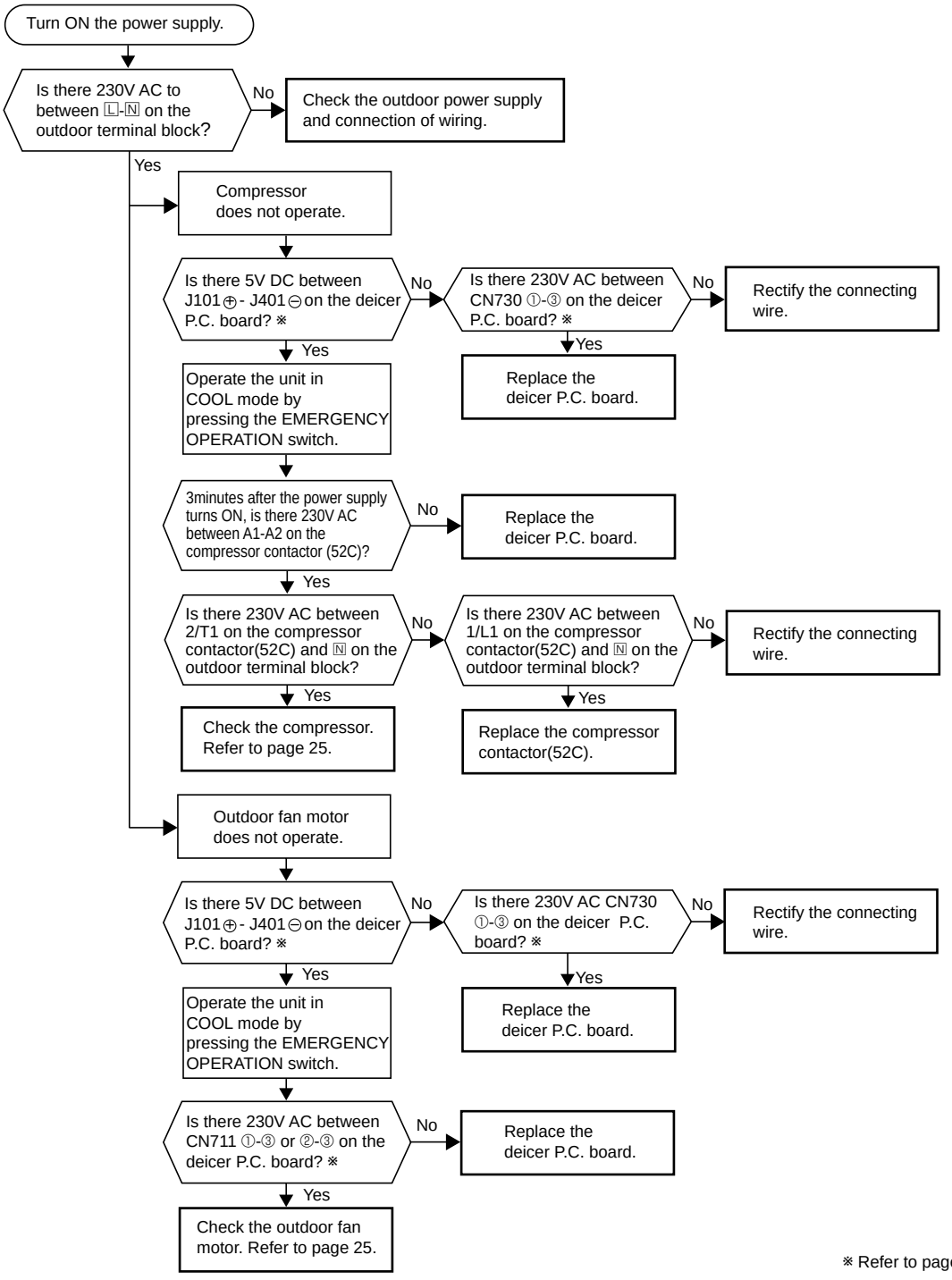
※ Reference value

Ⓟ:INNER PROTECTOR

9-4. Troubleshoot flow

Compressor and/or outdoor fan motor doesn't operate.

Ⓐ Check of outdoor unit **MU-GA80VB**


Turn ON the power supply.
Is there 230V AC to between L-N on the outdoor terminal block?
No
Check the outdoor power supply and connection of wiring.
Yes
Compressor does not operate.
Is there 5V DC between J101⊕ - J401⊖ on the deicer P.C. board? ※
No
Is there 230V AC between CN730 ①-③ on the deicer P.C. board? ※
No
Rectify the connecting wire.
Yes
Replace the deicer P.C. board.
Yes
Operate the unit in COOL mode by pressing the EMERGENCY OPERATION switch.
3minutes after the power supply turns ON, is there 230V AC between A1-A2 on the compressor contactor (52C)?
No
Replace the deicer P.C. board.
Yes
Is there 230V AC between 2/T1 on the compressor contactor(52C) and N on the outdoor terminal block?
No
Is there 230V AC between 1/L1 on the compressor contactor(52C) and N on the outdoor terminal block?
No
Rectify the connecting wire.
Yes
Check the compressor. Refer to page 25.
Yes
Replace the compressor contactor(52C).
Outdoor fan motor does not operate.
Is there 5V DC between J101⊕ - J401⊖ on the deicer P.C. board? ※
No
Is there 230V AC CN730 ①-③ on the deicer P.C. board? ※
No
Rectify the connecting wire.
Yes
Replace the deicer P.C. board.
Yes
Operate the unit in COOL mode by pressing the EMERGENCY OPERATION switch.
Is there 230V AC between CN711 ①-③ or ②-③ on the deicer P.C. board? ※
No
Replace the deicer P.C. board.
Yes
Check the outdoor fan motor. Refer to page 25.

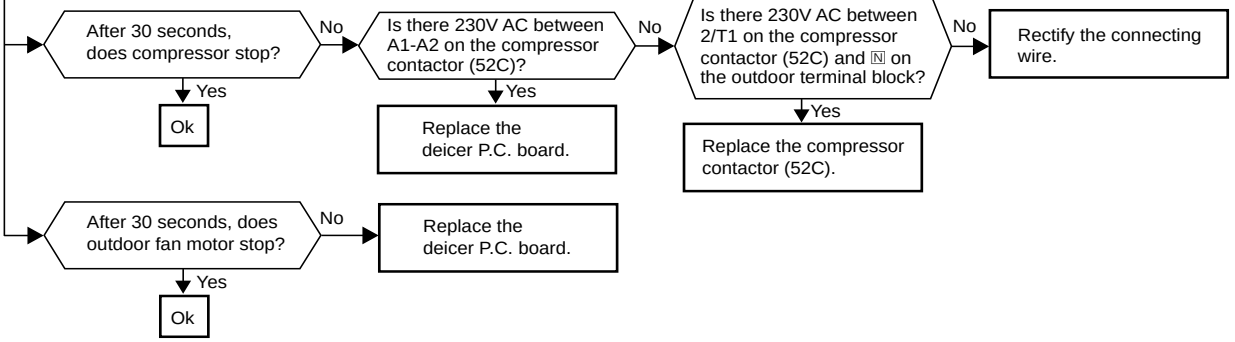
※ Refer to page 29.

Compressor and/or outdoor fan motor doesn't stop.

Ⓑ Check of outdoor unit

MU-GA80VB

① Turn OFF the power supply.
② After 30 seconds, turn ON the power supply again.
③ Operate the unit in COOL mode by pressing the EMERGENCY OPERATION switch.
④ Operate the unit for 1 minute or more and stop it by pressing the EMERGENCY OPERATION switch again.

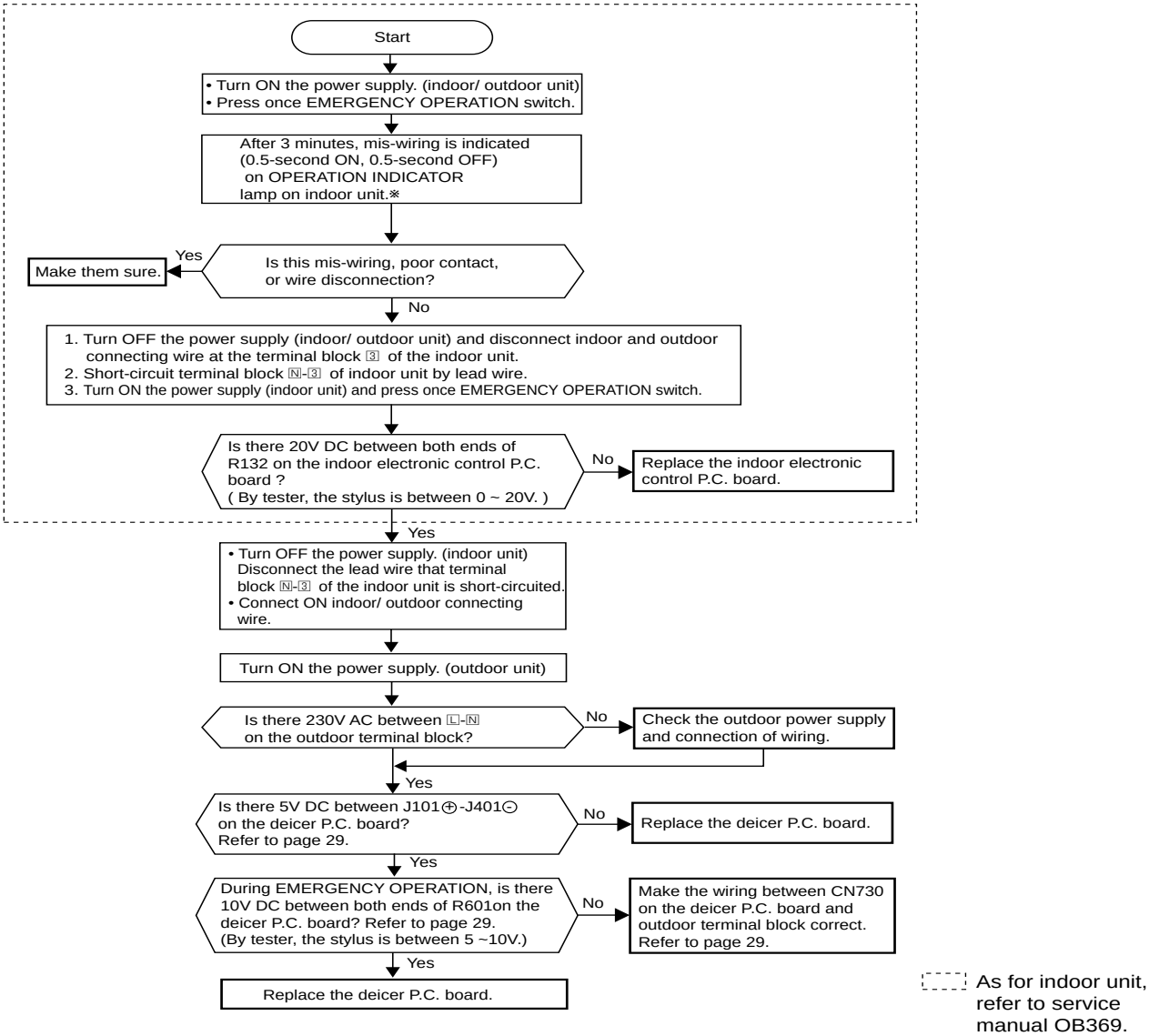

After 30 seconds, does compressor stop?
No
Is there 230V AC between A1-A2 on the compressor contactor (52C)?
No
Is there 230V AC between 2/T1 on the compressor contactor (52C) and N on the outdoor terminal block?
No
Rectify the connecting wire.
Yes
Ok
Yes
Replace the deicer P.C. board.
Yes
Replace the compressor contactor (52C).
After 30 seconds, does outdoor fan motor stop?
No
Replace the deicer P.C. board.
Yes
Ok

When OPERATION INDICATOR lamp flashes ON and OFF in every 0.5-second.
Outdoor unit doesn't operate.

ⓒHow to check mis-wiring

MU-GA80VB

※ Short circuit of JPG and JPS on the indoor electronic control P.C. board enables self -check to be displayed in 3 seconds.


Start
• Turn ON the power supply. (indoor/ outdoor unit)
• Press once EMERGENCY OPERATION switch.
After 3 minutes, mis-wiring is indicated (0.5-second ON, 0.5-second OFF) on OPERATION INDICATOR lamp on indoor unit.※
Yes
Make them sure.
Is this mis-wiring, poor contact, or wire disconnection?
No
1. Turn OFF the power supply (indoor/ outdoor unit) and disconnect indoor and outdoor connecting wire at the terminal block 3 of the indoor unit.
2. Short-circuit terminal block N-3 of indoor unit by lead wire.
3. Turn ON the power supply (indoor unit) and press once EMERGENCY OPERATION switch.
Is there 20V DC between both ends of R132 on the indoor electronic control P.C. board ?
(By tester, the stylus is between 0 ~ 20V.)
No
Replace the indoor electronic control P.C. board.
Yes
• Turn OFF the power supply. (indoor unit) Disconnect the lead wire that terminal block N-3 of the indoor unit is short-circuited.
• Connect ON indoor/ outdoor connecting wire.
Turn ON the power supply. (outdoor unit)
Is there 230V AC between L-N on the outdoor terminal block?
No
Check the outdoor power supply and connection of wiring.
Yes
Is there 5V DC between J101⊕-J401⊖ on the deicer P.C. board? Refer to page 29.
No
Replace the deicer P.C. board.
Yes
During EMERGENCY OPERATION, is there 10V DC between both ends of R601on the deicer P.C. board? Refer to page 29.
(By tester, the stylus is between 5 ~10V.)
No
Make the wiring between CN730 on the deicer P.C. board and outdoor terminal block correct. Refer to page 29.
Yes
Replace the deicer P.C. board.

As for indoor unit, refer to service manual OB369.

When OPERATION INDICATOR lamp flashes 10-time.
Cooling doesn't operate.

Ⓓ Check of LEV (Expansion valve) MU-GA80VB

Turn ON the power supply.
① During pressing both the OPERATION SELECT button and the TOO COOL button on the remote controller at the same time, press the RESET button.
② First, release the RESET button.
And release the other two buttons since all LCD in operation display section of the remote controller is displayed after 3 seconds.

↓

With remote controller set toward the indoor unit, press OPERATE/ STOP(ON/ OFF) button and confirm one beep tone.

↓

LEV operates in full-opening direction.

↓

Do you hear the expansion valve "click,click·····"?
Do you feel the expansion valve vibrate on touching it?
Yes → Ok

No ↓

Is LEV properly fixed to the expansion valve?
No → Properly fix the LEV to the expansion valve.

Yes ↓

Does the resistance of LEV have the characterictics on page 25?
Yes → Replace the deicer P.C. board.

No ↓

Replace the LEV.

① During pressing both the OPERATION SELECT button and the TOO COOL button on the remote controller at the same time, press the RESET button.
② First, release the RESET button.
And release the other two buttons since all LCD in operation display section of the remote controller is displayed after 3 seconds.

NOTE : After check of LEV, do the undermentioned operations.
1. Turn OFF the power supply and turn ON again.
2. Press the RESET button on the remote controller.

When OPERATION INDICATOR lamp flashes 6-time.
Thermistors in the outdoor unit are abnormal.

Ⓔ Check of outdoor thermistor MU-GA80VB

※ Disconnect the connectors CN662 from the deicer P.C. board.
(Check the characteristics of each thermistor.)

Turn OFF the power supply.

↓

Discharge temperature thermistor(RT62)
Measure resistance between CN 662 ① and ②.

Ambient temperature thermistor(RT63)
Measure resistance between CN 662 ③ and ④.

↓

Does the resistancs of thermistor have the characteristics on page 29?
Yes → Connect CN662. Turn ON the power supply and press the EMERGENCY OPERATION switch.

No ↓

Replace the thermistor.

↓

Does the unit operate 10 minutes or more?
No → Replace the deicer P.C. board.

Yes ↓

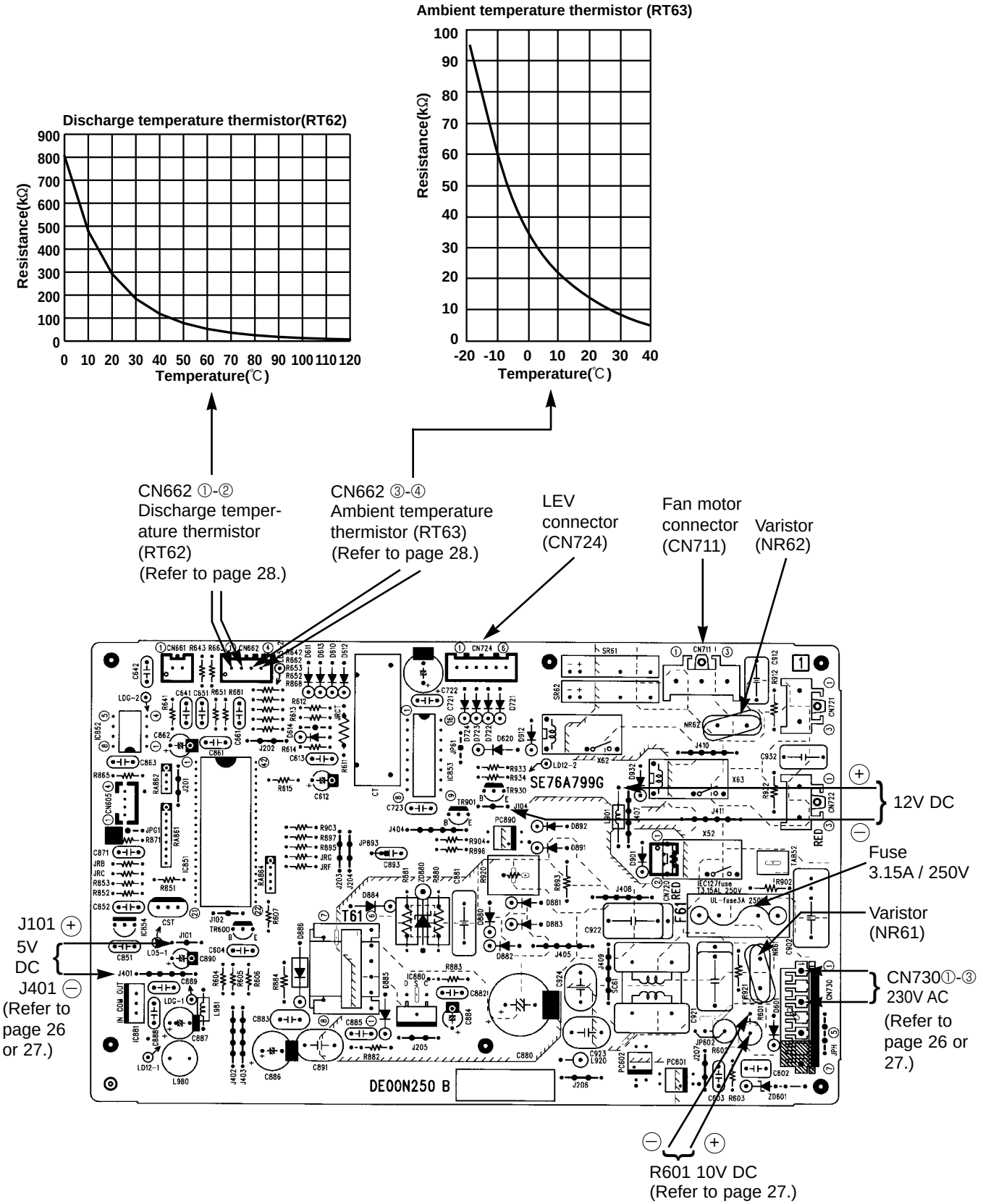
Ok ※.

※ It is thought defective contact of the connector.

9-5. Test point diagram and voltage

MU-GA80VB -E1

Outdoor deicer P.C. board

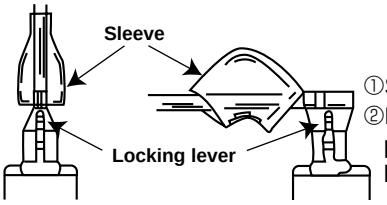


10 DISASSEMBLY INSTRUCTIONS

<"Terminal with lock mechanism" Detaching points>

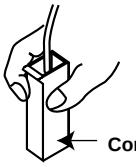
In case of terminal with lock mechanism, detach the terminal as shown below.
There are two types (Refer to (1) and (2)) of the terminal with lock mechanism.
The terminal with no lock mechanism can be removed by pulling it out.
Check the shape of the terminal and work.

(1) Slide the sleeve and check if there is a locking lever or not.



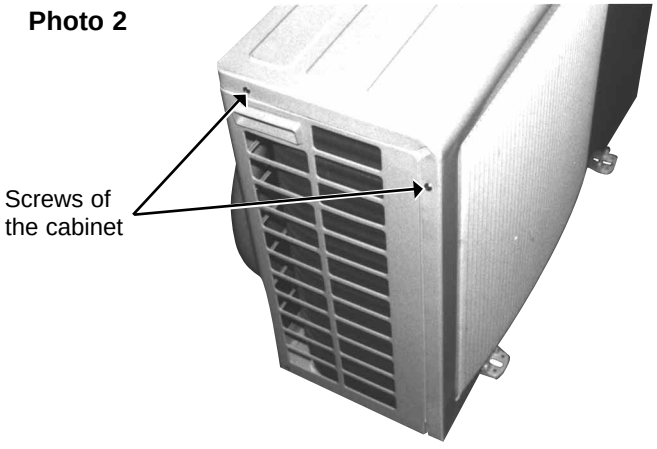
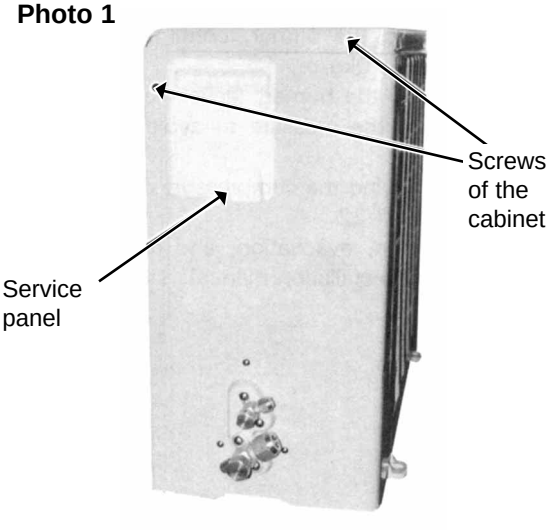
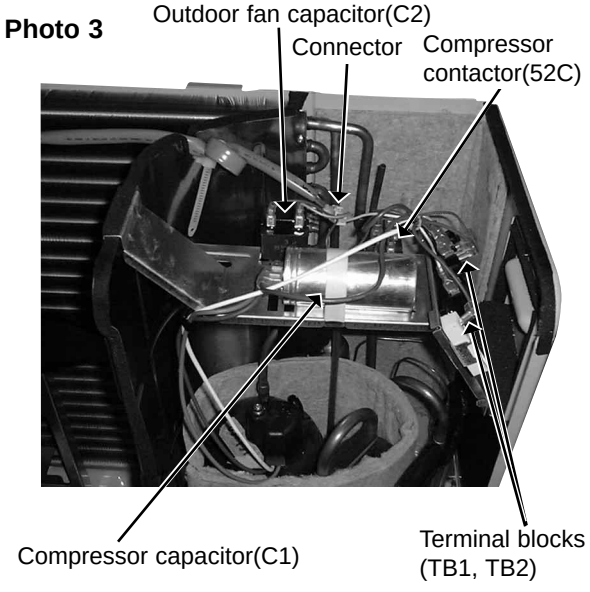
①Slide the sleeve.
②Pull the terminal while pushing the locking lever.

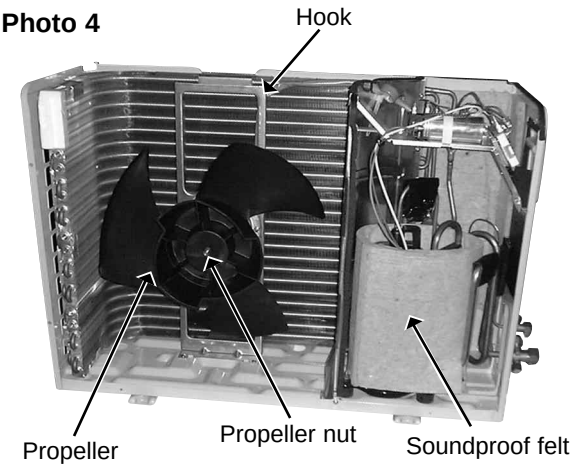
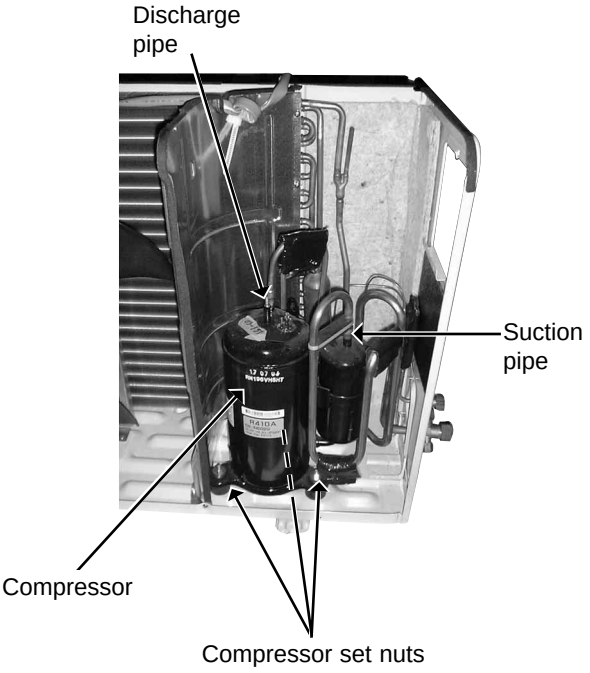
(2) The terminal with this connector is a terminal with lock mechanism



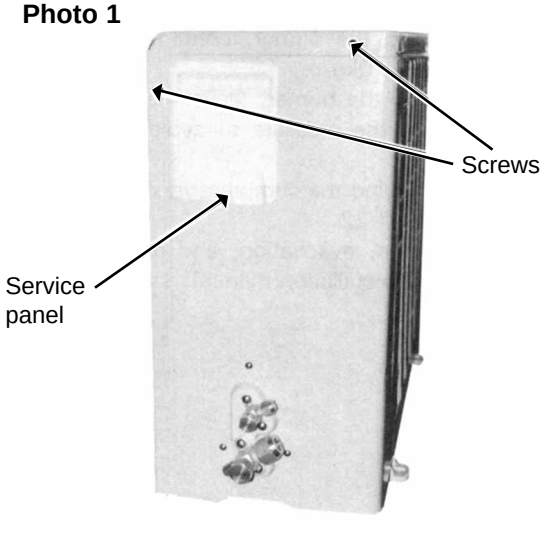
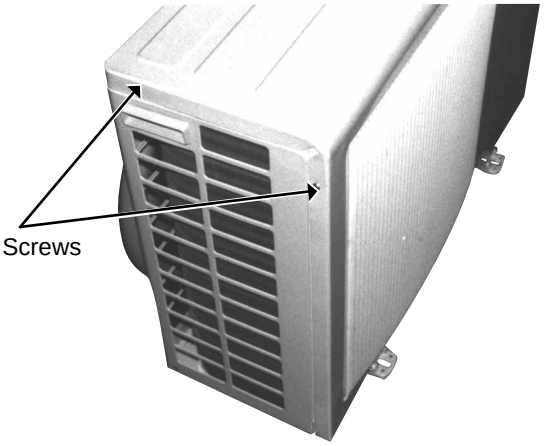
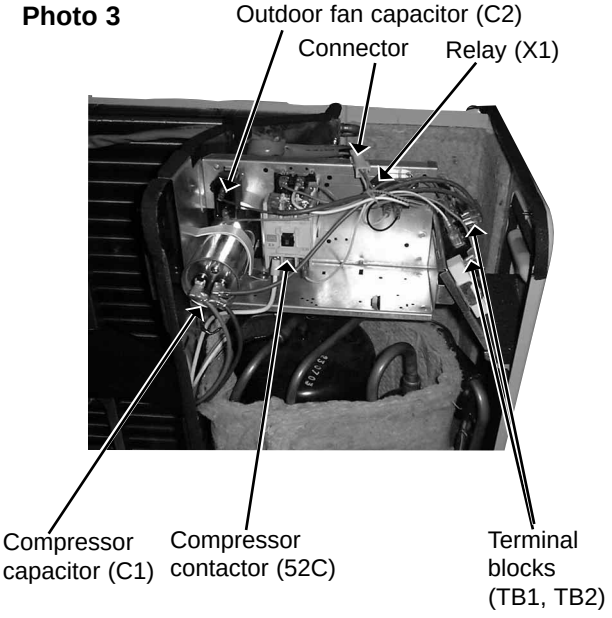
①Hold the sleeve, and pull out the terminal slowly.

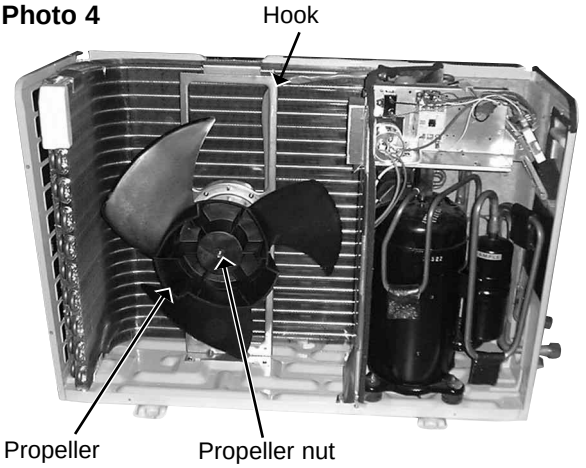
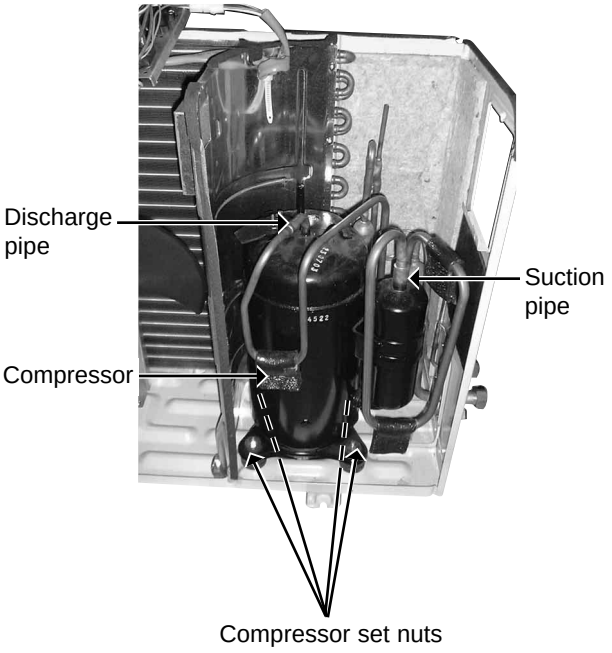
10-1. MU-GA50VB -E1 OUTDOOR UNIT

OPERATING PROCEDURE	PHOTOS
1. Removing the cabinet (1) Remove the screws of the cabinet. (2) Hold the down of the cabinet on the both side and remove the cabinet. **Photo 2**  	**Photo 1** 
2. Removing the electrical parts (1) Remove the service panel and the cabinet. (2) Remove the following parts. •Compressor capacitor (C1) •Outdoor fan capacitor (C2) •Terminal block (TB1, TB2) •Compressor contactor (52C)	**Photo 3** 

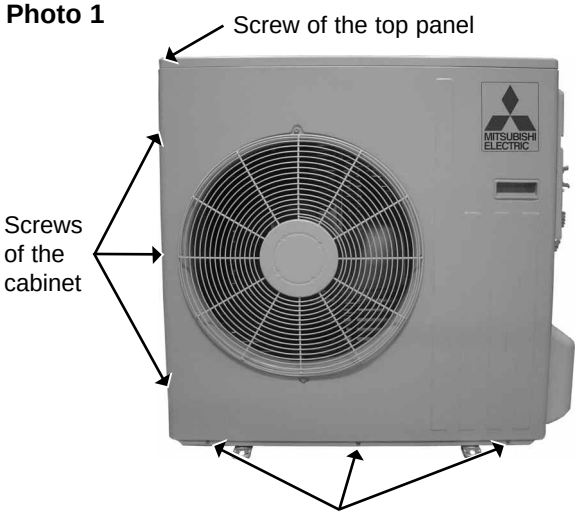
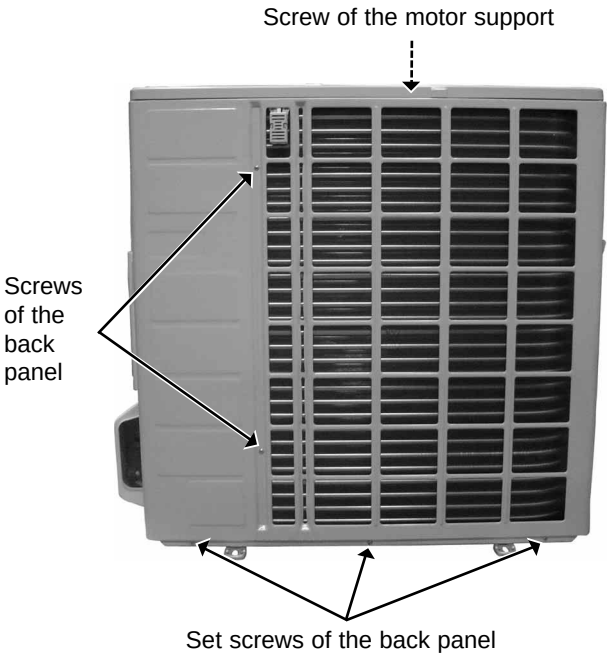
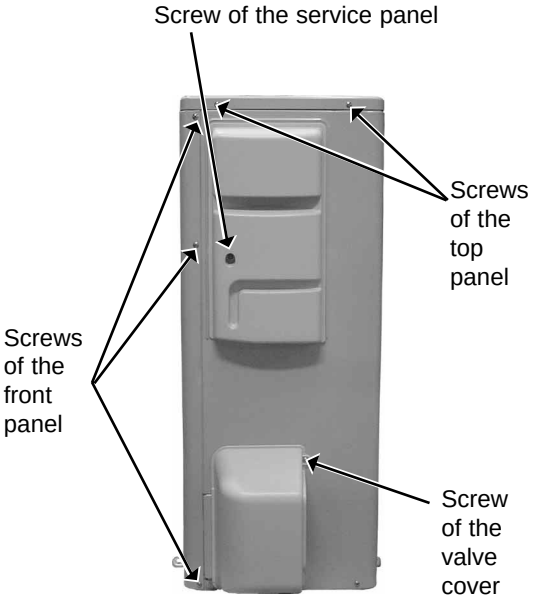
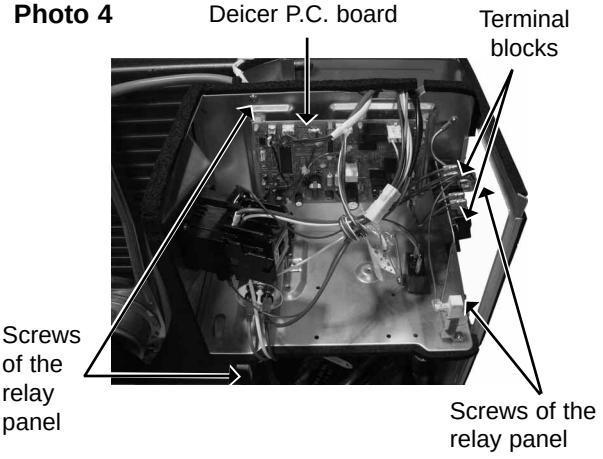
OPERATING PROCEDURE	PHOTOS
3. Removing the outdoor fan motor (1) Remove the cabinet. (Refer to 1.) (2) Disconnect the connector and remove the hooked lead wire from the fan motor. (3) Remove the propeller nut and remove the propeller. (4) Remove screws fixing the outdoor fan motor. (5) Remove the outdoor fan motor.	**Photo 4** 
4. Removing the compressor (1) Remove the cabinet. (Refer to 1.) (2) Remove the relay panel. (3) Remove the soundproof felt. (4) Remove the terminal cover on the compressor. (5) Disconnect lead wires from the glass terminal of the compressor. (6) Recover gas from the refrigerant circuit. (7) Disconnect the welded part of the discharge pipe. (8) Disconnect the welded part of the suction pipe. (9) Remove nuts fixing the compressor. (10) Remove the compressor. **NOTE** ● Before using a burner, reclaim gas from the pipes until the pressure gauge shows 0 kg/cm^2 (MPa). ● Use the burner under the condition that gas can be recovered even when the inner pressure rises by heat.	**Photo 5** 

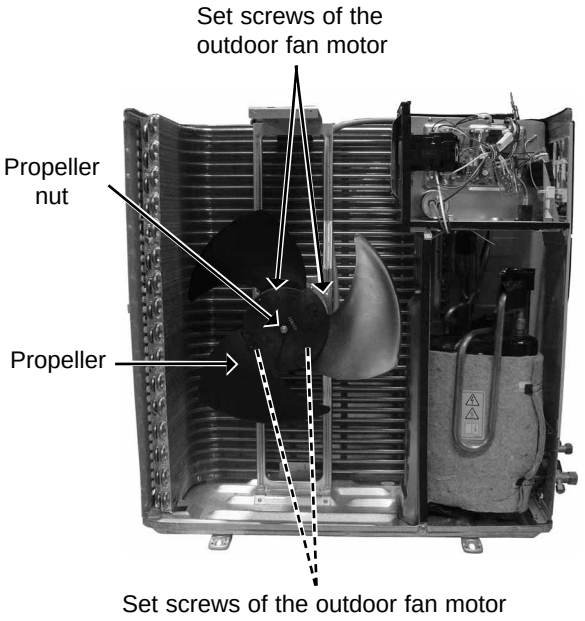
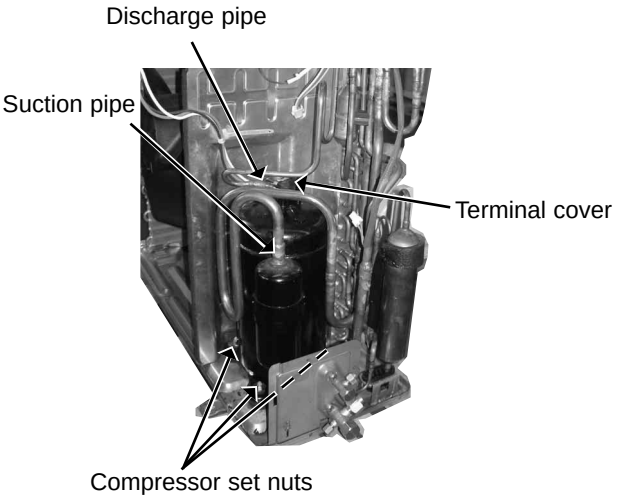
10-2. MU-GA60VB -E1
OUTDOOR UNIT

OPERATING PROCEDURE	PHOTOS
1. Removing the cabinet (1) Remove the screws of the cabinet. (2) Hold the bottom of the cabinet on the both side to remove the cabinet.	**Photo 1**  **Photo 2** 
2. Removing the electrical parts (1) Remove the cabinet . (Refer to 1.) (2) Remove the following parts. •Compressor capacitor (C1) •Outdoor fan capacitor (C2) •Terminal block(TB1, TB2) •Relay (X1) •Compressor contactor (52C)	**Photo 3** 

OPERATING PROCEDURE	PHOTOS
3. Removing the outdoor fan motor (1) Remove the cabinet. (Refer to 1.) (2) Disconnect the connector and remove the hocked lead wire from the fan motor. (3) Remove the propeller nut and remove the propeller. (4) Remove the screws fixing the fan motor. (5) Remove the outdoor fan motor.	**Photo 4** 
4. Removing the compressor (1) Remove the cabinet. (Refer to 1.) (2) Remove the soundproof felt. (3) Remove the terminal cover on the compressor. (4) Disconnect the lead wires from the glass terminal of the compressor. (5) Recover gas from the refrigerant circuit. **NOTE:** Recover gas from the pipes until the pressure gauge shows 0 kg/cm^2 (0MPa). (6) Disconnect the welded part of the discharge pipe. (7) Disconnect the welded part of the suction pipe. (8) Remove nuts fixing the compressor. (9) Remove the compressor.	**Photo 5** 

10-3. MU-GA80VB - E1
OUTDOOR UNIT

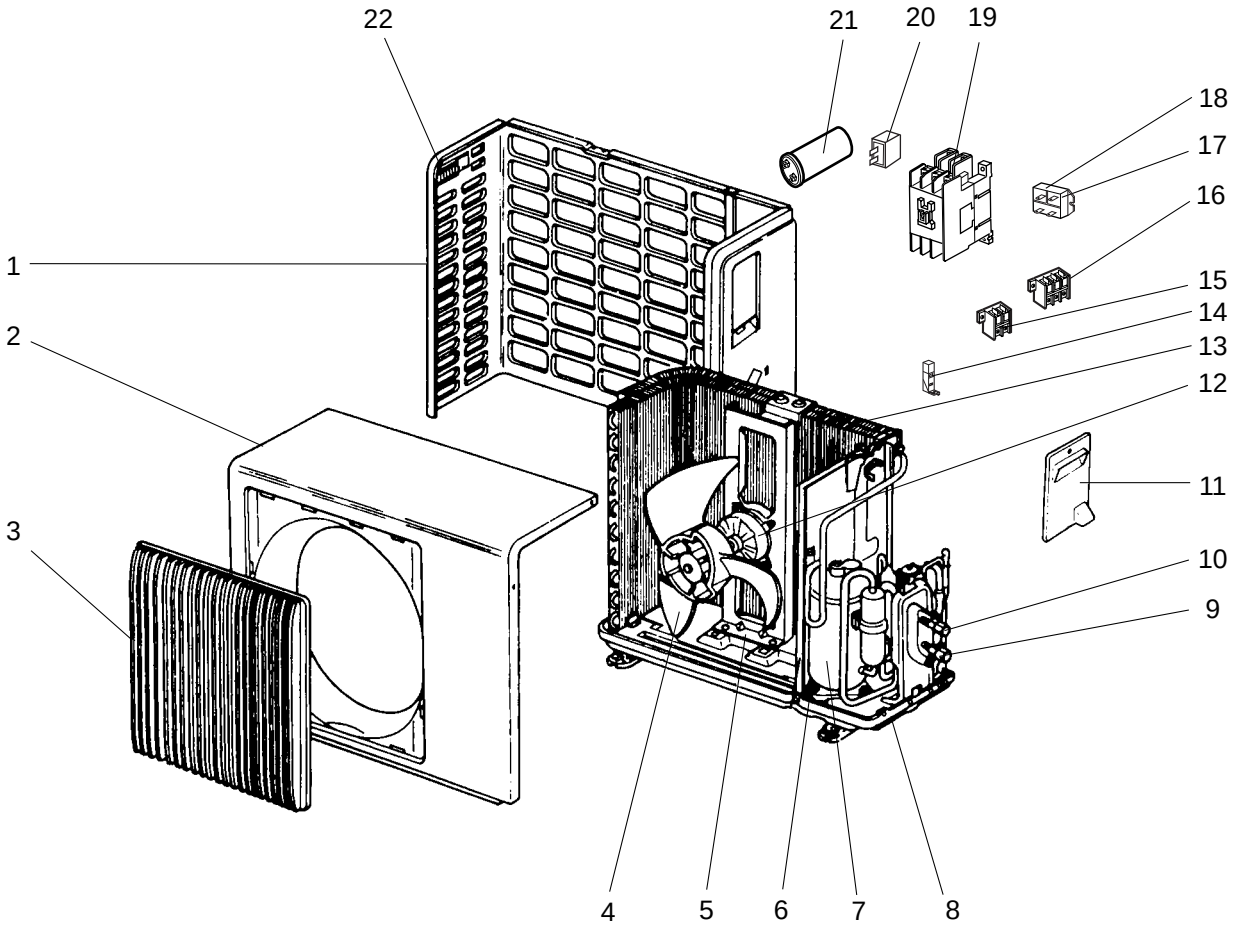
OPERATING PROCEDURE	PHOTOS
1.Removing the cabinet (1) Remove the screws of the service panel. (2) Remove the screws of the top panel. (3) Remove the screw of the valve cover. (4) Remove the service panel. (5) Remove the top panel. (6) Remove the valve cover. (7) Remove the screws of the front panel. (8) Remove the front panel. (9) Remove the screws of the back panel. (10) Remove the back panel.	**Photo 1** 
Photo 3  	**Photo 2** 
2. Removing the deicer P.C. board (1) Remove the service panel and the cabinet. (2) Disconnect all the connectors and the terminals on the deicer P.C. board. (3) Remove the deicer P.C. board.	**Photo 4** 

OPERATING PROCEDURE	PHOTOS
3. Removing the propeller and the outdoor fan motor (1) Remove the cabinet. (Refer to 1.) (2) Remove the propeller nut and the propeller. **NOTE : Loose the propeller in the rotating direction for removal.** When attaching the propeller, align the mark on the propeller and the motor shaft cut section. Set the propeller in position by using the cut on the shaft and the mark on the propeller. (3) Remove the clamp of outdoor fan motor lead wire and disconnect the outdoor fan motor connector. (4) Remove the screws fixing the outdoor fan motor. (5) Remove the outdoor fan motor.	**Photo 5** 
4. Removing the compressor (1) Remove the cabinet. (Refer to 1.) (2) Remove the relay panel. (3) Remove the soundproof felt. (4) Remove the terminal cover on the compressor. (5) Disconnect lead wires from the compressor. (6) Recover gas from the refrigerant circuit. **NOTE:** Recover gas from the pipes until the pressure gauge shows 0 kg/cm^2 (0MPa). (7) Disconnect the welded part of the discharge pipe. (8) Disconnect the welded part of the suction pipe. (9) Remove nuts fixing the compressor. (10) Remove the compressor.	**Photo 6** 

11 PARTS LIST

MU-GA50VB -E1
MU-GA60VB -E1

11-1. OUTDOOR UNIT
STRUCTURAL PARTS, ELECTRICAL PARTS AND FUNCTIONAL PARTS

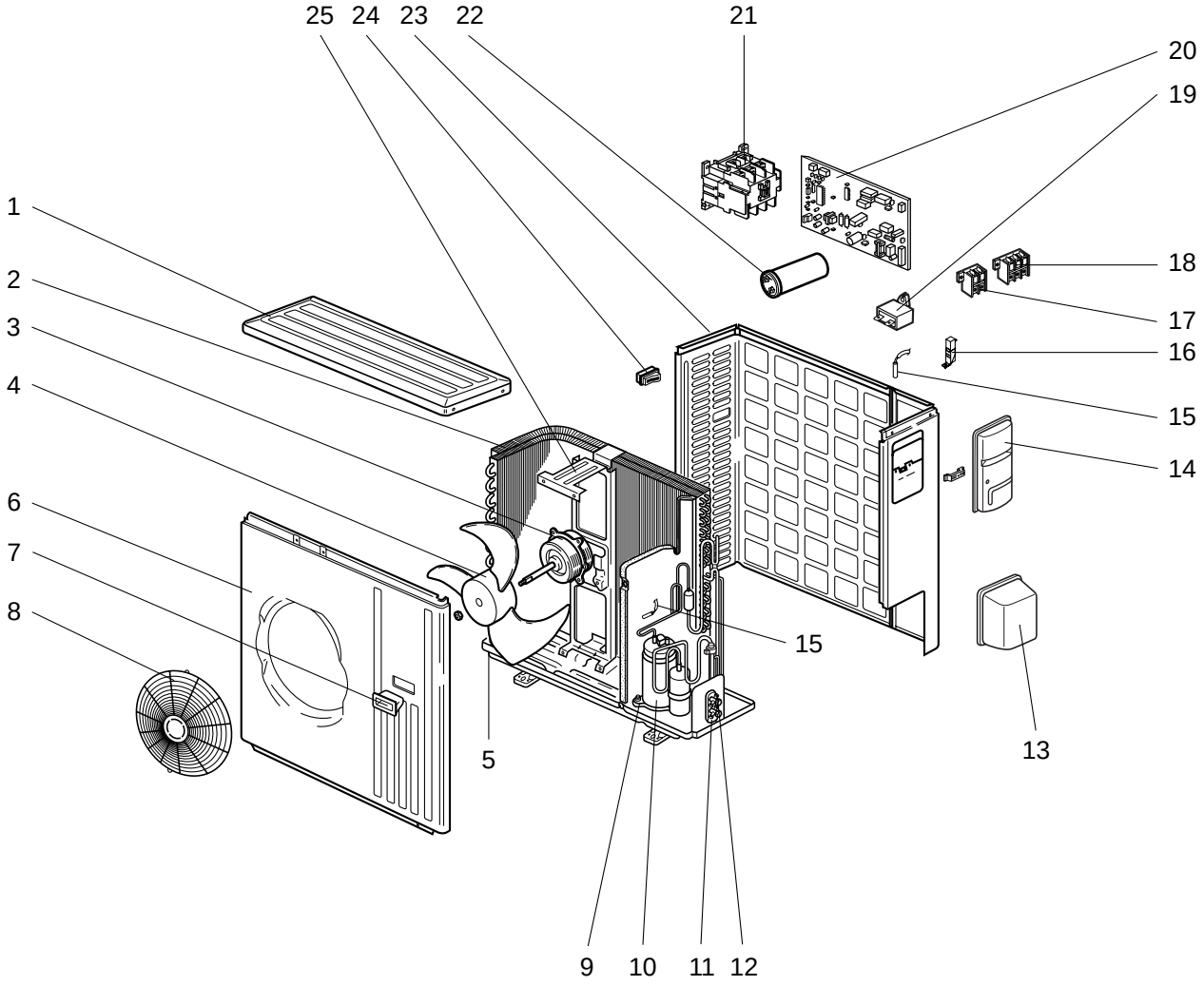


MU-GA50VB -E1
MU-GA60VB -E1
11-1. OUTDOOR UNIT
STRUCTURAL PARTS, ELECTRICAL PARTS AND FUNCTIONAL PARTS

Part numbers that is circled is not shown in the illustration.

No.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit		Remarks
				MU-GA50VB - E1	MU-GA60VB - E1	
1	E02 817 233	BACK PANEL		1	1	
2	E02 817 232	CABINET		1	1	
3	E02 817 521	GRILLE		1	1	
4	E02 141 501	PROPELLER		1	1	
5	E02 139 515	MOTOR SUPPORT		1	1	
6	E02 075 506	COMPRESSOR RUBBER SET		3		3RUBBERS/SET
	E02 527 506	COMPRESSOR RUBBER SET			4	4RUBBERS/SET
7	E02 817 900	COMPRESSOR	MC	1		RN196VHSHT
	E02 821 900	COMPRESSOR	MC		1	NN29VBAHT
8	E02 817 290	BASE		1		
	E02 818 290	BASE			1	
9	E02 817 661	STOP VALVE(GAS)		1		ϕ12.7
	E02 818 661	STOP VALVE(GAS)			1	ϕ15.88
10	E02 817 662	STOP VALVE(LIQUID)		1	1	ϕ 6.35
11	E02 817 245	SERVICE PANEL		1	1	
12	E02 816 301	OUTDOOR FAN MOTOR	MF	1		RA6V50 - □□
	E02 818 301	OUTDOOR FAN MOTOR	MF		1	RA6V60 - □□
13	E02 817 630	OUTDOOR HEAT EXCHANGER		1		
	E02 818 630	OUTDOOR HEAT EXCHANGER			1	
14	E02 890 383	SURGE ABSORBER	DSAR	1		
	E02 895 383	SURGE ABSORBER	DSAR		1	
15	E02 818 374	TERMINAL BLOCK	TB2	1	1	2P
16	E02 817 374	TERMINAL BLOCK	TB1	1	1	3P
17	E02 466 340	COMPRESSOR CONTACTOR	52C	1		
18	E02 466 340	RELAY	X1		1	
19	E07 012 340	COMPRESSOR CONTACTOR	52C		1	
20	E02 895 351	OUTDOOR FAN CAPACITOR	C2	1	1	3.0μF/440V AC
21	E02 888 353	COMPRESSOR CAPACITOR	C1	1		40μF/440V AC
	E02 889 353	COMPRESSOR CAPACITOR	C1		1	55μF/440V AC
22	E02 817 009	HANDLE		1	1	
㉓	E02 412 936	CAPILLARY TUBE		1		ϕ3.0×ϕ1.6×600
	E02 217 936	CAPILLARY TUBE			1	ϕ3.0×ϕ1.8×500

MU-GA80VB - E1
11-2. OUTDOOR UNIT STRUCTURAL PARTS, ELECTRICAL PARTS AND FUNCTIONAL PARTS



MU-GA80VB - E1
11-2. OUTDOOR UNIT STRUCTURAL PARTS, ELECTRICAL PARTS AND FUNCTIONAL PARTS

Part numbers that are circled are not shown in the illustration.

No.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit	Remarks
				MU-GA80VB - E1	
1	E02 819 297	TOP PANEL		1	
2	E02 819 630	OUTDOOR HEAT EXCHANGER		1	
3	E02 819 301	OUTDOOR FAN MOTOR	MF	1	RA6V75- □□
4	E02 214 501	PROPELLER		1	
5	E02 819 290	BASE		1	
6	E02 819 232	CABINET		1	
7	E02 819 009	HANDLE		1	
8	E02 819 521	FAN GUARD		1	
9	E02 527 506	COMPRESSOR RUBBER SET		4	4RUBBERS/SET
10	E02 819 900	COMPRESSOR	MC	1	NN37VAAHT
11	E02 819 661	STOP VALVE(GAS)		1	ϕ15.88
12	E02 819 662	STOP VALVE(LIQUID)		1	ϕ9.52
13	E02 819 650	VALVE COVER		1	
14	E02 819 245	SERVICE PANEL		1	
15	E02 819 309	THERMISTOR	RT62, RT63	1	DISCHARGE, AMBIENT
16	E02 890 383	SURGE ABSORBER	DSAR	1	
17	E02 821 374	TERMINAL BLOCK	TB2	1	2P
18	E02 817 374	TERMINAL BLOCK	TB1	1	3P
19	E02 890 351	OUTDOOR FAN CAPACITOR	C2	1	4.0μF/440V AC
20	E02 896 451	DEICER P.C. BOARD		1	
21	E02 890 340	COMPRESSOR CONTACTOR	52C	1	
22	E02 890 353	COMPRESSOR CAPACITOR	C1	1	60μF/440V AC
23	E02 819 233	BACK PANEL(OUT)		1	
24	E02 817 009	HANDLE		1	
25	E02 726 515	MOTOR SUPPORT		1	
(26)	E02 822 640	EXPANSION VALVE		1	
(27)	E02 819 493	EXPANSION VALVE COIL	LEV	1	
(28)	E02 127 382	FUSE	F61	1	250V/3.15A
(29)	E02 336 385	VARISTOR	NR61	1	
(30)	E02 214 386	CZ SURGE ABSORBER	CZ	1	
(31)	E02 819 936	CAPILLARY TUBE(TAPER PIPE)		1	ϕ3.6xϕ2.4x50
(32)	E02 262 936	CAPILLARY TUBE		1	ϕ4.0xϕ2.4x200
	E02 527 936	CAPILLARY TUBE		1	ϕ4.0xϕ2.4x100

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